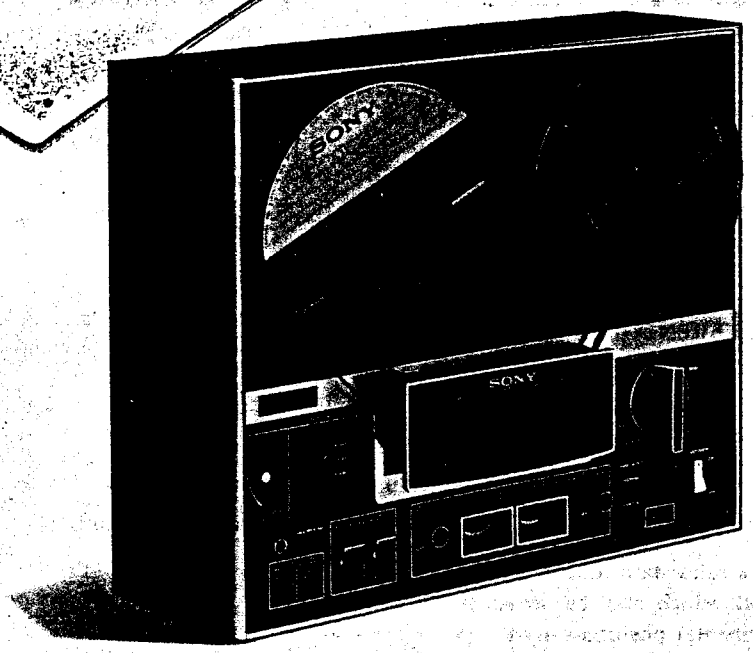
TC-266

ARCHIVEXEMPLAR

General Export Model



ISO

Set using ISO screws

SPECIFICATIONS

Power Requirements: AC 60 Hz, 117V, 30W

Track System: Four-track stereo and mono

Reel Size: 7" (18 cm) maximum

Tape Speed: 7½ ips, 3¾ ips and 1⅞ ips (19 cm/s, 9.5 cm/s and 4.8 cm/s)

Recording Time: (with 1,800 ft tape)

Tape speed	4-track stereo	4-track mono
7½ ips (19 cm/s)	1.5 hrs	3 hrs
3¾ ips (9.5cm/s)	3 hrs	6 hrs
1⅞ ips (4.8cm/s)	6 hrs	12 hrs

Frequency Response:
20~25,000 Hz at 7½ ips (19 cm/s)
30~20,000 Hz at 3¾ ips (9.5 cm/s)
30~9,000 Hz at 1⅞ ips (4.8 cm/s)

Signal-to-Noise Ratio: 52 dB or better

Flutter and Wow:
0.09% at 7½ ips (19 cm/s)
0.12% at 3¾ ips (9.5 cm/s)
0.17% at 1⅞ ips (4.8 cm/s)

Recording Bias Frequency: Approx. 160 kHz

Inputs:
Two MIC inputs
Impedance: 600Ω
Maximum sensitivity: -72 dB (0.19 mV)
Two AUX INputs
Impedance: Approx. 100 kΩ
Maximum sensitivity: -22 dB (0.06 V)

Outputs:
Two LINE OUTputs
Impedance: 100 kΩ or more
Output level: 0 dB (0.775 V) with 100 kΩ load
HEADPHONE output
Impedance: 8Ω load
Output level: -28dB (30 mV)

Semiconductors: 27 transistors and 4 diodes

Dimensions: 16 7/16 (W) x 8 5/16 (H) x 14 13/16" (D) (416 x 210 x 376 mm)

Weight: 22 lb 8 oz (10 kg)

Original

SONY® SERVICE MANUAL

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1. GENERAL DESCRIPTION

SONY Model TC-266 is a solid state four-track, two-channel stereophonic deck which may be operated in either vertical or horizontal position on AC household current.

Tape Tension Regulator

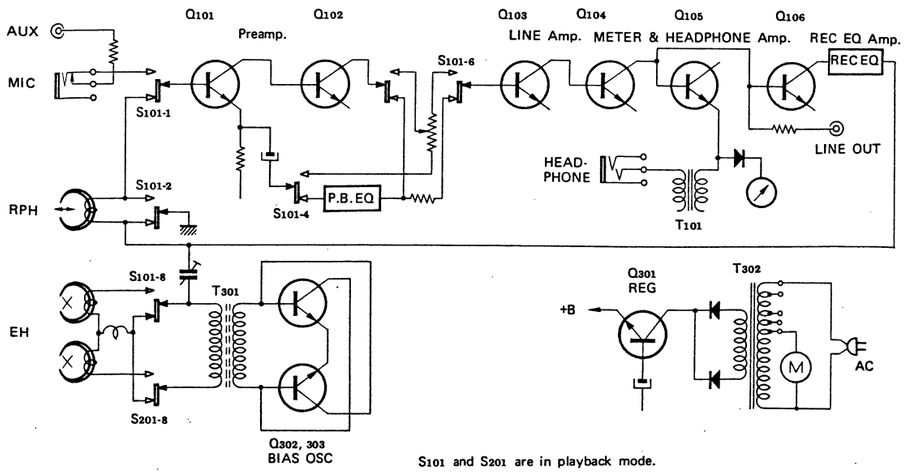
The machine can operate always under the stable tape running by the tape tension regulator which quickly responds to the subtle change of tape tension, so that the tape tension regulator can reduce the wow and flutter extremely.

Automatic Shut-off Mechanism

When threading the tape, the shut-off lever is held by the threaded tape in operating position. If tape runs out or breaks, the shut-off lever swings outward and activates the automatic shut-off mechanism. As a result, the function selector knob can return to the STOP position without setting it manually.

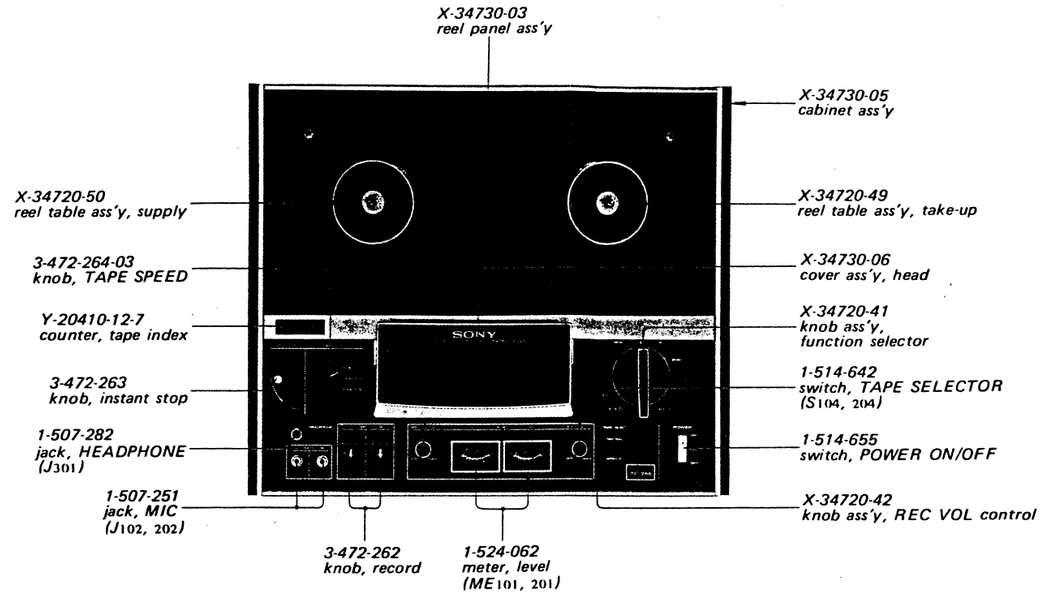
Note: When threading the tape, make certain that there is no slack in the threaded tape, otherwise the function selector knob will not be set at the desired position.

2. BLOCK DIAGRAM

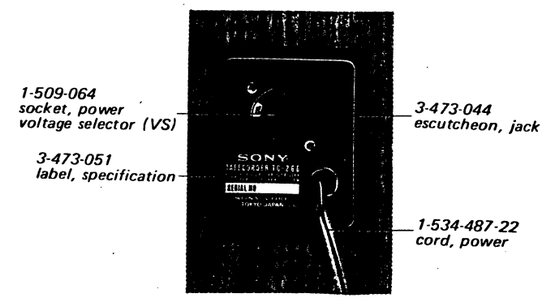


S101 and S201 are in playback mode.

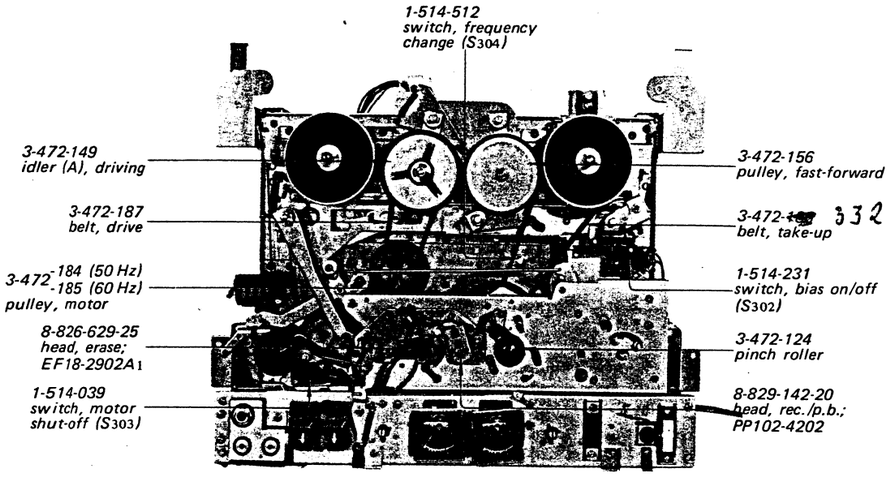
3. CABINET – TOP VIEW –



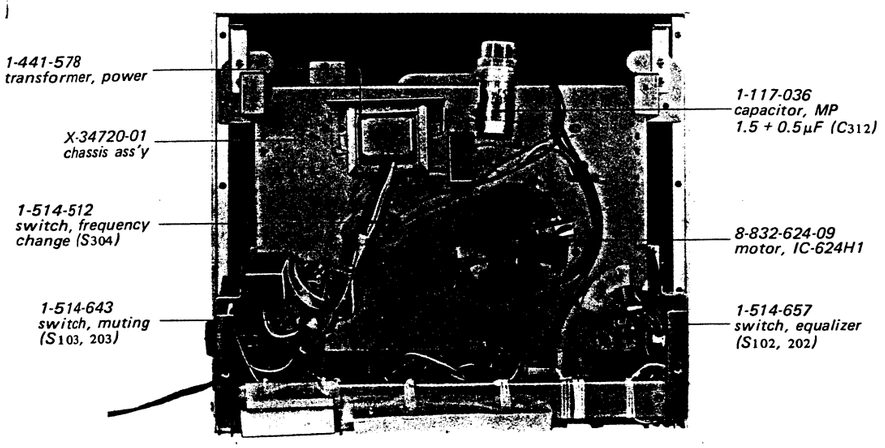
4. CABINET –SIDE VIEW –



5. CHASSIS –TOP VIEW –

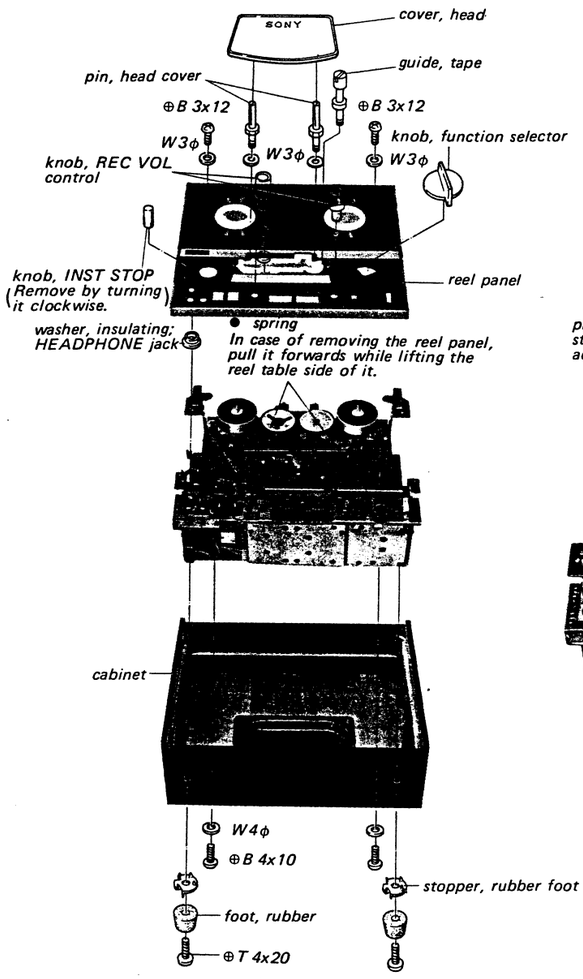


6. CHASSIS – BOTTOM VIEW –

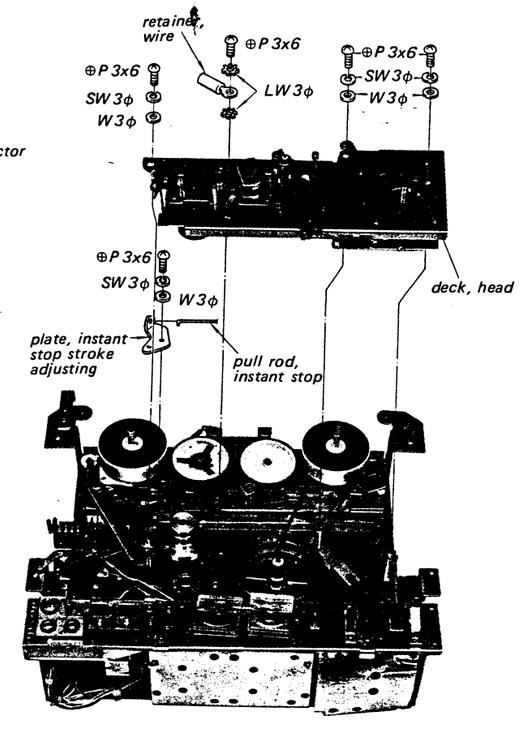


7. DISASSEMBLY

7-1. Cabinet Removal



7-2. Head Deck Removal



CAUTION
(on repairing)

(1) Never put the machine upside-down on the hard plate with the head cover removed, or the pin of the tape shifter, the shut-off arm pin, the tension arm and others shall be bent by the weight of the machine.
If it is necessary to put the machine upside-down put it on a soft cloth with the head cover attached.

(2) Do not short-circuit B+ circuit to ground, or the transistor Q304 will be broken.

(3) Turn on the power switch after being certain that the motor fan does not touch anything.

(4) When removing the instant stop knob, turn it clockwise.

8. MECHANICAL ADJUSTMENT

In case the parts described in the talbe are reassembled or replaced, the following adjustments and checks are necessary.

Parts	Adjusting or Checking Items
Head Deck	8-7. Tape Shifter Position Adjustment (page 9) 8-22. Instant Stop Adjustment (page 13)
Motor	8-11. Motor Pulley Height Check (page 10) 8-11. Capstan Idler Position Check (page 10) 8-23. Tape Speed Check (page 13)
Reel Table	8-12. Reel Table Height Adjustment (page 10) 8-13. Take-up Back-tension Adjustment (page 10) 8-14. FWD Torque Adjustment (page 10)
Driving Idler	8-18. FF & REW Torque Adjustments (page 12) 8-20. Driving Idler Height Check (page 12)
Tension Regulator Arm, Tension Regulator Arm Brake Felt	8-1. Tension Regulator Adjustment (page 7) 8-2. Tension Regulator Back-tension Adjustment (page 7)

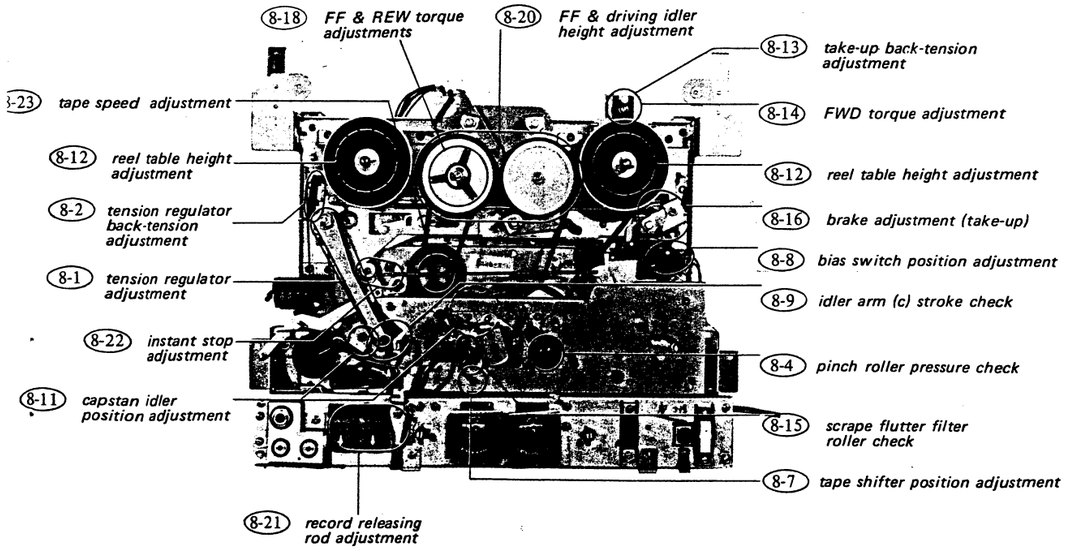

8-18 FF & REW torque adjustments
8-20 FF & driving idler height adjustment
8-13 take-up back-tension adjustment
8-23 tape speed adjustment
8-14 FWD torque adjustment
8-12 reel table height adjustment
8-12 reel table height adjustment
8-2 tension regulator back-tension adjustment
8-16 brake adjustment (take-up)
8-1 tension regulator adjustment
8-8 bias switch position adjustment
8-9 idler arm (c) stroke check
8-22 instant stop adjustment
8-4 pinch roller pressure check
8-11 capstan idler position adjustment
8-15 scrape flutter filter roller check
8-7 tape shifter position adjustment
8-21 record releasing rod adjustment

Fig. 8-1 Adjusting parts location (1)

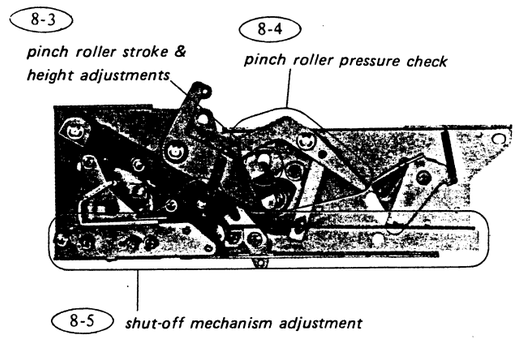


Fig. 8-2 Adjusting parts location (2)

8-1. Tension Regulator Adjustment

— in STOP mode —

(1) Adjust the adjusting screw so that the clearance shown is 8.5mm ($^{11}/_{32}$") after having been turned the reel table counterclockwise with hand.
(2) After the adjustment, apply lock paint to the screw.

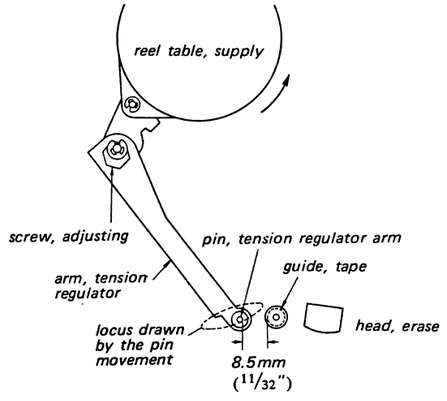


Fig. 8-3 Tension regulator adjustment

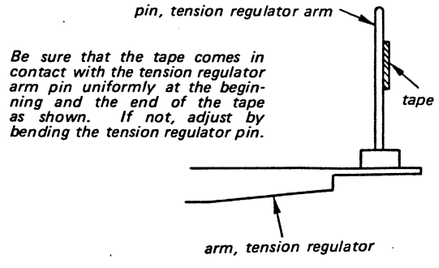

pin, tension regulator arm
Be sure that the tape comes in contact with the tension regulator arm pin uniformly at the beginning and the end of the tape as shown. If not, adjust by bending the tension regulator pin.
tape
arm, tension regulator

Fig. 8-4 Tension regulator adjustment

8-2. Tension Regulator Back-tension Adjustment

— in FWD & FF modes —

(1) Make the tension regulator adjustment.
(2) Adjust by changing the hooking position of the spring to obtain the specified values on the tension gauge at the beginning and the end of the tape as shown in Fig. 8-5.
If it is not obtained the specified values, adjust by bending the stud or perform the tension regulator adjustment.

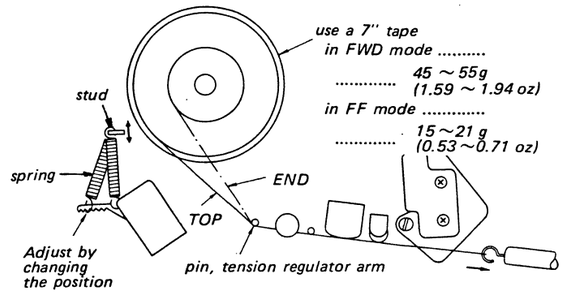


Fig. 8-5 Tension regulator back-tension adjustment

8-3. Pinch Roller Stroke & Height Adjustments

(1) Remove the head deck (See page 5).
(2) Adjust the screw ① so that the pinch roller shaft comes in contact with the retractive lever at the position (A) shown in Fig. 8-7, in STOP mode.
(3) Fix the screw ① while pushing the joint lever in the direction shown with arrow in Fig. 8-6.
(4) Be sure that the washer for the pinch roller shaft does not come in contact with the part indicated with ▲ on the retractive lever shown in Fig. 8-7 when the function selector knob is changed slowly from FWD to FF.
(5) After the adjustment, apply lock paint to the screw.

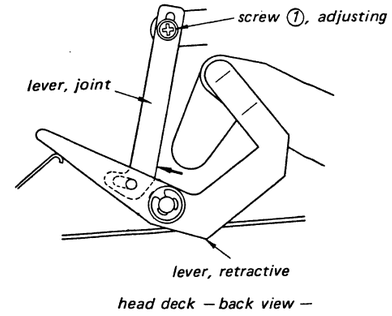


Fig. 8-6 Pinch roller stroke adjustment

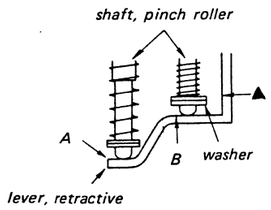


Fig. 8-7 Pinch roller stroke adjustment

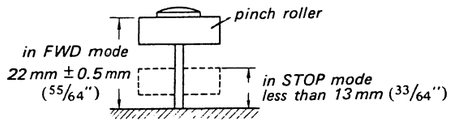


Fig. 8-8 Pinch roller height adjustment

※ Dummy Capstan

As the pinch roller stroke adjustment and the pinch roller pressure check require the dummy capstan, make it as follows.

Prepare a flywheel ass'y (for TC-266) and remove the capstan shaft (dummy capstan) from the flywheel ass'y by patting the head of the capstan shaft with the hammer, taking care not to bend the shaft. Flywheel Ass'y Part No.: X-34720-03

8-4. Pinch Roller Pressure Check

– in STOP mode –

(1) Put the dummy capstan ※ into the capstan bearing and be sure that the clearance between the pinch levers (A) and (B) is approx. 0.5mm (1/64").

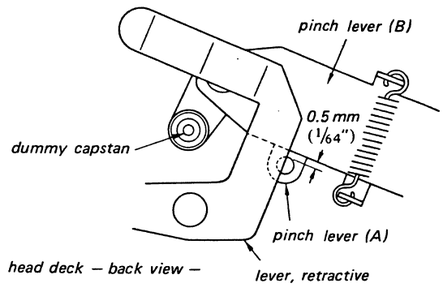


Fig. 8-9 Pinch roller pressure check

Be sure that the tension gauge indicates 800 ~ 1,000 g (1 lb 12 oz ~ 2 lb 3 oz) when the pinch roller is detached from the capstan in FWD mode.

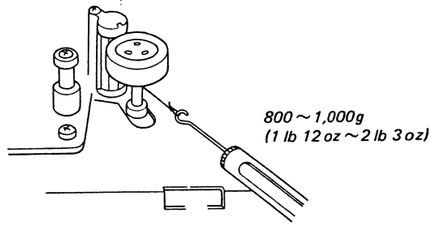


Fig. 8-10 Pinch roller pressure check

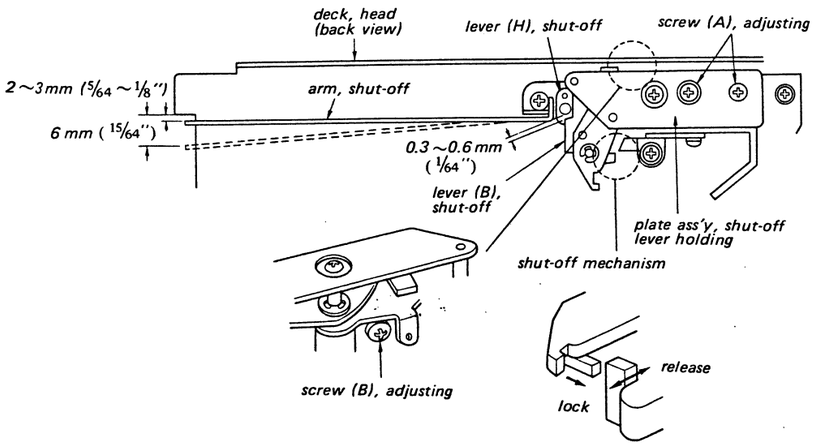


Fig. 8-11 Shut-off mechanism adjustment

8-5. Shut-off Mechanism Adjustment

– in STOP mode –

(1) Loosen the two screws (A) and adjust by positioning the shut-off lever holding plate ass'y so that the shut-off mechanism is locked when the clearance between the shut-off arm and the head deck is 6 mm (15/64"), and the shut-off mechanism is released completely when it is 2 ~ 3 mm (5/64 ~ 1/8").

(2) Adjust the screw (B) so that the clearance between the shut-off levers (B) and (H) is 0.3 ~ 0.6 mm (1/64") in STOP mode.

(3) After the adjustment, apply lock paint to the screws.

8-6. Speed Selector Cam Position Adjustment

– in FWD mode –

Adjust the screw to locate the idler arm (c) pin at the center position between the two stopper slits shown, at 19 cm/s tape speed.

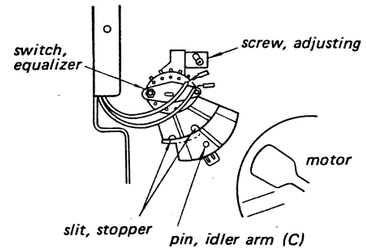
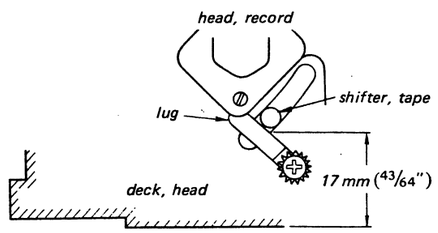


Fig. 8-12 Speed selector cam position adjustment

8-7. Tape Shifter Position Adjustment

– in STOP mode –



Adjust by positioning the lug.

Fig. 8-13 Tape shifter position adjustment

8-8. Bias Switch Position Adjustment

(1) Loosen the two screws and adjust by positioning the switch.

(2) Be sure that the switch is in ON position in FWD mode, and when the function selector knob is changed slowly from FWD to STOP the record knob is released after the switch is in OFF.

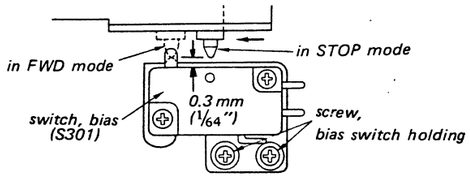


Fig. 8-14 Bias switch position adjustment

8-9. Idler Arm (C) Stroke Check

– in FWD mode at 4.8 cm/s (1 7/8 ips) tape speed –

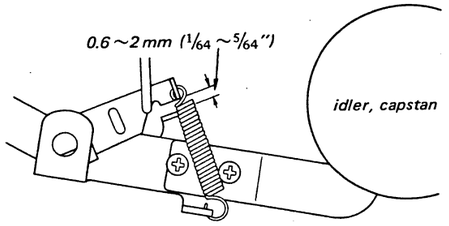


Fig. 8-15 Idler arm (c) stroke check

8-10. Muting Switch Position Adjustment

– in FWD mode –

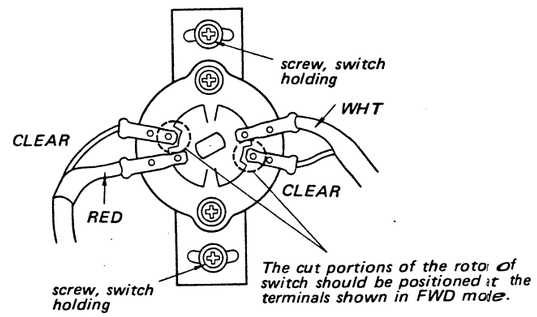

screw, switch holding
WHT
CLEAR
CLEAR
RED
screw, switch holding
The cut portions of the rotor of switch should be positioned at the terminals shown in FWD mode.

Fig. 8-16 Muting switch position adjustment

8-11. Capstan Idler Position Adjustment

— in FWD mode —

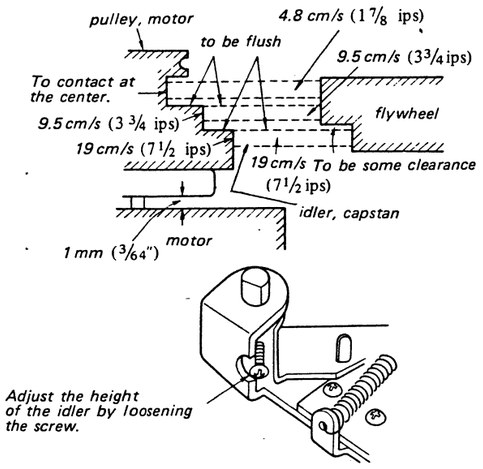

pulley, motor
to be flush
4.8 cm/s (1 7/8 ips)
9.5 cm/s (3 3/4 ips)
To contact at the center.
flywheel
9.5 cm/s (3 3/4 ips)
19 cm/s (7 1/2 ips)
19 cm/s (7 1/2 ips)
To be some clearance
idler, capstan
motor
1 mm (3/64")
Adjust the height of the idler by loosening the screw.

Fig. 8-17 Capstan idler position adjustment

After the adjustment, be sure that the capstan idler does not come in contact with the flywheel and the motor pulley in STOP mode with 60 Hz use and the clearance between the capstan idler and the motor pulley is more than 3 mm (1/8") in STOP mode with 50 Hz use.

8-12. Reel Table Height Adjustment

— in FWD, REW & FF modes —

(1) Adjust the height of the reel table by loosening the screw so that the tape does not come in contact with the reel in FWD, REW & FF modes.
(2) Perform the back-tension and FWD torque adjustments.
(3) After the adjustment, apply lock paint to the screw.

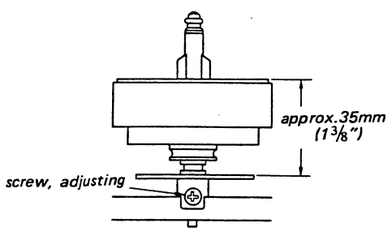


Fig. 8-18 Reel table height adjustment

8-13. Take-up Back-Tension Adjustment

— in REW mode —

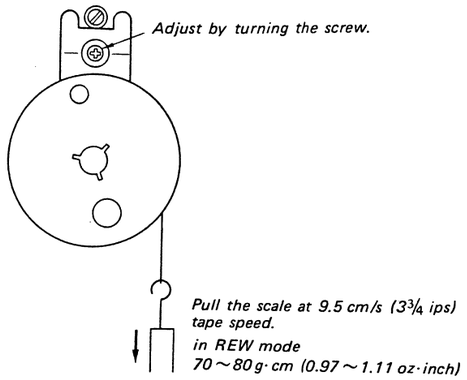


Fig. 8-19 Take-up back-tension adjustment

After the adjustment, perform the FWD torque adjustment and apply lock paint to the screw.

8-14. FWD Torque Adjustment

— in FWD mode —

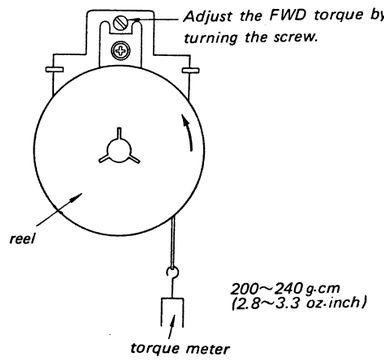


Fig. 8-20 FWD torque adjustment

8-15. Scrape Flutter Filter Roller Check

— in FWD mode at 4.8 cm/s (1 7/8 ips) tape speed —

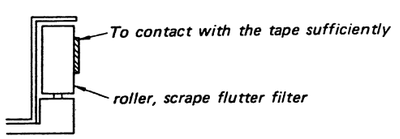


Fig. 8-21 Scrape flutter filter roller check

8-16. Brake Adjustment

— in STOP mode —

supply brake torque	direction A	500 ~ 700 g·cm (6.96 ~ 9.74 oz·inch)
	direction B	1,000 ~ 1,500 g·cm (13.9 ~ 21 oz·inch)

take-up brake torque	direction C	400~550 g·cm (5.56~7.65 oz·inch)
	direction D	1,600 ~ 1,800 g·cm (22.2 ~ 25 oz·inch)

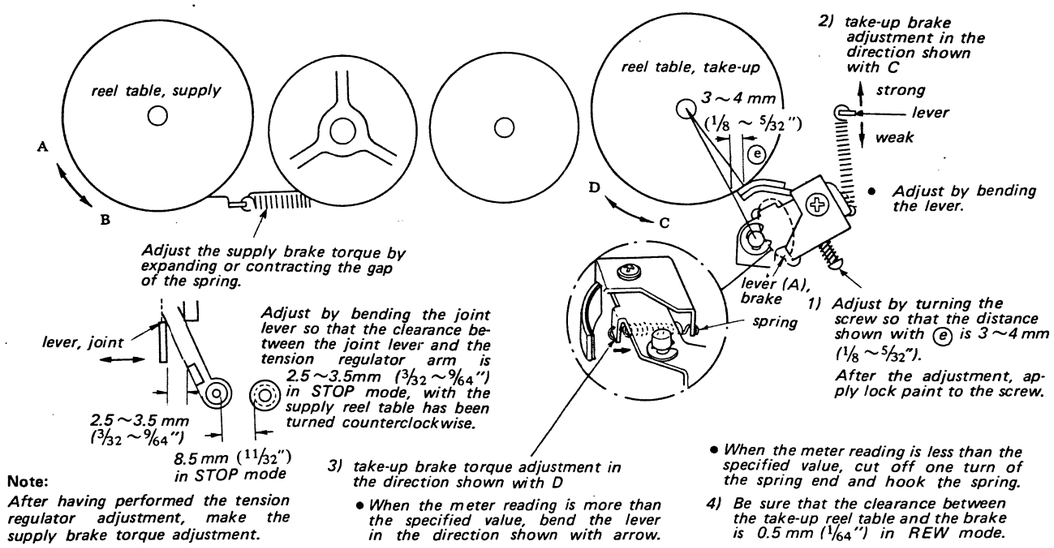

reel table, supply
A
B
Adjust the supply brake torque by expanding or contracting the gap of the spring.
lever, joint
Adjust by bending the joint lever so that the clearance between the joint lever and the tension regulator arm is 2.5 ~ 3.5mm (3/32 ~ 9/64") in STOP mode, with the supply reel table has been turned counterclockwise.
2.5 ~ 3.5 mm (3/32 ~ 9/64")
8.5 mm (11/32") in STOP mode
Note:
After having performed the tension regulator adjustment, make the supply brake torque adjustment.
reel table, take-up
3 ~ 4 mm (1/8 ~ 5/32")
2) take-up brake adjustment in the direction shown with C
strong
lever
weak
• Adjust by bending the lever.
D
C
lever (A), brake spring
1) Adjust by turning the screw so that the distance shown with (e) is 3 ~ 4 mm (1/8 ~ 5/32").
After the adjustment, apply lock paint to the screw.
3) take-up brake torque adjustment in the direction shown with D
• When the meter reading is more than the specified value, bend the lever in the direction shown with arrow.
• When the meter reading is less than the specified value, cut off one turn of the spring end and hook the spring.
4) Be sure that the clearance between the take-up reel table and the brake is 0.5 mm (1/64") in REW mode.

Fig. 8-22 Brake adjustment

8-17. Tape Slack Check

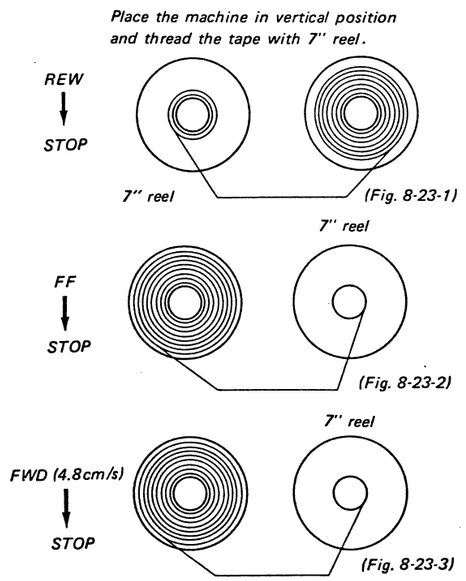


Fig. 8-23 Tape slack check

(1) When changing the function selector knob slowly from REW to STOP at the end of the tape, be sure not to slack the tape (See Fig. 8-23-1).
(2) When changing the function selector knob quickly from FF to STOP at the beginning of the tape, be sure not to slack the tape (See Fig. 8-23-2).
(3) When pulling the instant stop knob in FWD mode at the beginning of the tape, be sure not to slack the tape.
(4) When changing the function selector knob from FWD to STOP at the beginning of the tape at the 4.8cm/s (1 7/8 ips) tape speed, be sure not to slack the tape (See Fig. 8-23-3).

8-18. FF & REW Torque Adjustments

— in FF & REW modes —

Adjust the position of the leaf spring to obtain the specified values on the torque meter.
(Read the values when the driving idler is forced to stop the motion.)

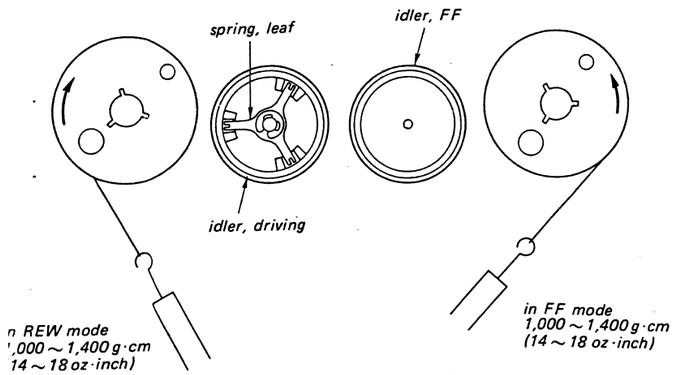


Fig. 8-24 FF & REW torque adjustments

8-19. Flywheel Brake Check

— in REW mode —

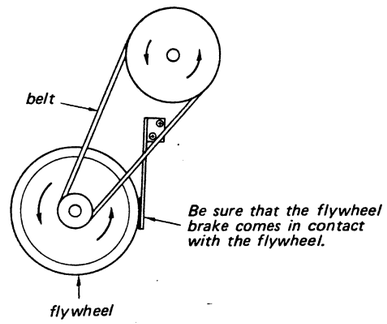
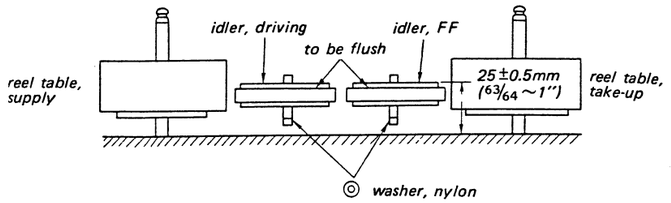


Fig. 8-25 Flywheel brake check

8-20. FF & Driving Idler Height Adjustments

— in STOP mode —



Adjust the height of the idler by adding or removing the nylon washer.

Fig. 8-26 FF & driving idler height adjustment

nylon washer

Part No.	Thickness
3-425-197-01	0.13 mm
3-425-197-11	0.25 mm
3-425-197-21	0.50 mm

8-21. Record Releasing Rod Adjustment

— in STOP mode —

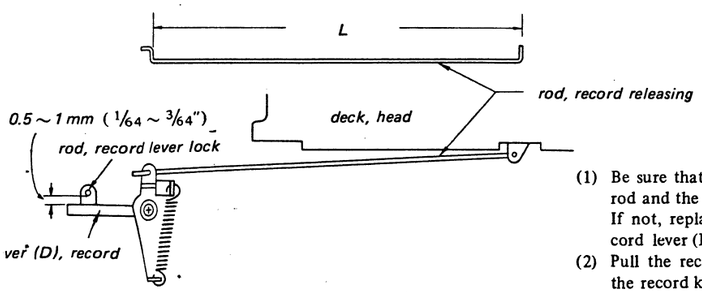


Fig. 8-27 Record releasing rod adjustment

rod, record releasing

Part No.	L (length)
3-473-040-02	121.0 mm
3-473-040-11	121.5 mm
3-473-040-21	122.0 mm

(1) Be sure that the clearance between the record lever lock rod and the record lever (D) is 0.5 ~ 1 mm (1/64 ~ 3/64"). If not, replace the record releasing rod or bend the record lever (D).
(2) Pull the record knobs in STOP mode and be sure that the record knob is released before the pinch roller comes in contact with the capstan when changing the function selector knob to FWD.

8-22. Instant Stop Adjustment

— in STOP mode —

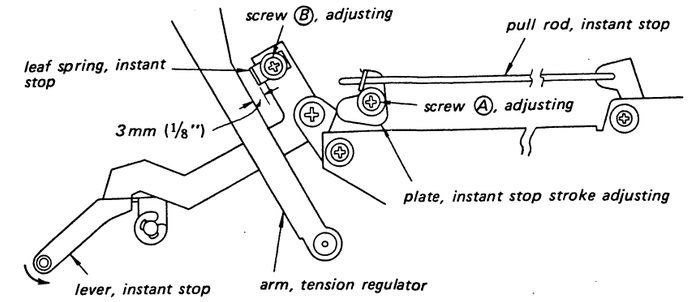


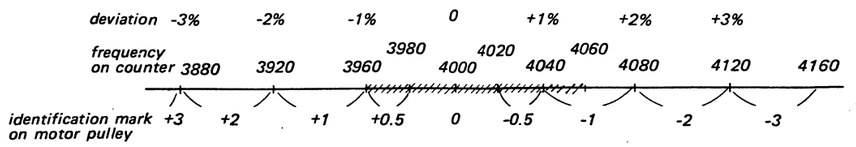
Fig. 8-28 Instant stop adjustment

(1) Be sure that the tension regulator adjustment has been made.
(2) Adjust the screw Ⓐ so that the clearance between that pinch roller and the capstan is 1 ~ 2 mm (3/64 ~ 5/64") when pulling the instant stop lever in FWD mode, and the instant stop knob is not locked when pulling in STOP, FF and REW modes.
(3) Adjust the screw Ⓑ so that the clearance between the tension regulator arm and the instant stop leaf spring is 3 mm (1/8") in STOP mode.
(4) After the adjustment, apply lock paint to the screws.

8-23. Tape Speed Adjustment

— in FWD mode —

(1) Playback the SONY speed check tape (SPC-47) at 19 cm/s (7 1/2 ips) tape speed in horizontal position.
(2) If the counter reading is out of 3,960 ~ 4,060 Hz replace with the motor pulley with identification mark shown below.
(As for Part No. of the motor pulley, refer to page 23.)



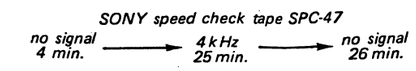


Fig. 8-29 Tape speed adjustment

Standard

	19 cm/s (7 1/2 ips)	9.5 cm/s (3 3/4 ips)	4.8 cm/s (1 7/8 ips)
Deviation (%)	±1.5	±1.5	±1.5
Variation Limit (%)	1	1	1

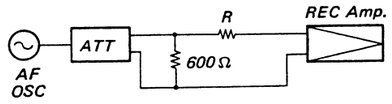
9. ELECTRICAL ADJUSTMENT

Note:

(1) Before connecting the measuring equipments to the input or the output jack of the machine, take the impedance-matching correctly as shown below.

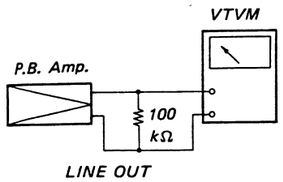
Input	Rated Input Level (Input Impedance)	Output	Rated Output Level (Load Impedance)
MIC	−60 dB (600 Ω)	LINE OUT	0 dB (100 kΩ)
AUX	−10 dB (10 kΩ)		
REC/P.B. Connector	−33 dB (80 kΩ)	REC/P.B. Connector	0 dB (100 kΩ)

Input Connection



Input	R
AUX	10 kΩ
MIC	0 Ω
REC/P.B. Connector	80 kΩ

Output Connection



(2) During the adjustment, set the REC level controls to the position where the LINE OUT level is 0 dB (0.775 V) when delivering a 1 kHz signal of −60 dB (0.775 mV) into the MIC jack.

(3) Before making the head adjustment, demagnetize and clean the REC/P.B. head with swab or soft cloth dampened with denatured alcohol.

(4) The switches should be set in the following positions, unless otherwise specified.

TAPE SELECTOR SW ..... NORMAL
TAPE SPEED SW ..... 19 cm/s (7½ ips)

(5) A new tape or a sufficiently-demagnetized tape should be used as a blank test tape.

(6) Details of SONY alignment tapes, "J-19-K1" and "J-19-F1":

tone / alignment tape	1st	2nd	3rd	4th	5th	6th	7th
J-19-K1	10 kHz −10 dB	400 Hz 0 dB					
J-19-F1	10 kHz −10 dB	400 Hz 0 dB	400 Hz −10 dB	10 kHz −10 dB	7 kHz −10 dB	80 Hz −10 dB	40 Hz −10 dB

(7) The adjustments should be performed in numerical order, unless otherwise specified.

(9-1) Tape Pass Adjustment
(9-2) Tape Curl Adjustment
(9-3) REC/P.B. Head Azimuth and Angle Adjustments
(9-4) REC/P.B. Head Phase Check
(9-5) P.B. Output Level Adjustment and Level Meter Calibration
(9-6) P.B. Equalizer Adjustment
(9-7) P.B. S/N Ratio Measurement
(9-8) Trap Coil Adjustment
(9-9) Record Bias Adjustment
(9-10) Record Level Adjustment
(9-11) Erase Ratio Measurement
(9-12) Wow & Flutter Measurement
(9-13) Overall Frequency Response Measurement
(9-14) Overall S/N Ratio Measurement
(9-15) Overall Distortion Ratio Measurement
(9-16) Cross-talk Measurement (between channels)
(9-17) Cross-talk Measurement (between tracks)
(9-18) Input & Output Level Checks of REC/P.B. Connector

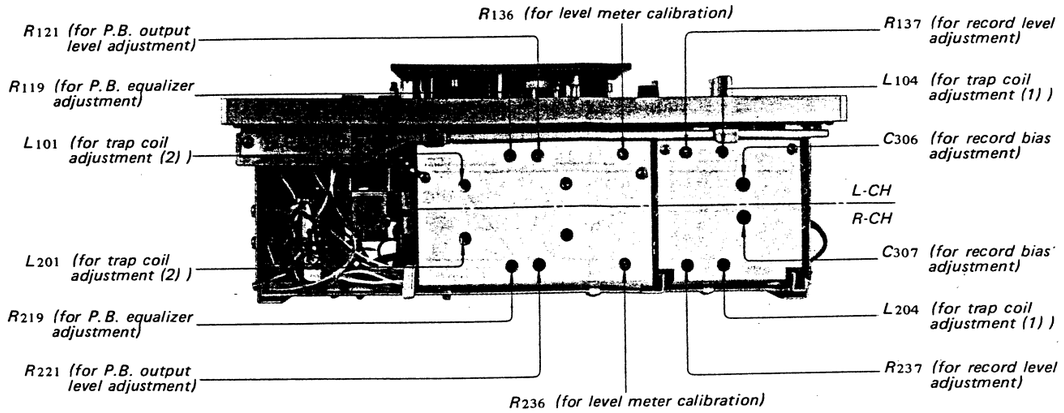

R136 (for level meter calibration)
R121 (for P.B. output level adjustment)
R137 (for record level adjustment)
R119 (for P.B. equalizer adjustment)
L104 (for trap coil adjustment (1))
L101 (for trap coil adjustment (2))
C306 (for record bias adjustment)
L-CH
R-CH
L201 (for trap coil adjustment (2))
C307 (for record bias adjustment)
R219 (for P.B. equalizer adjustment)
L204 (for trap coil adjustment (1))
R221 (for P.B. output level adjustment)
R237 (for record level adjustment)
R236 (for level meter calibration)

Fig. 9-1 Adjusting parts location (1)

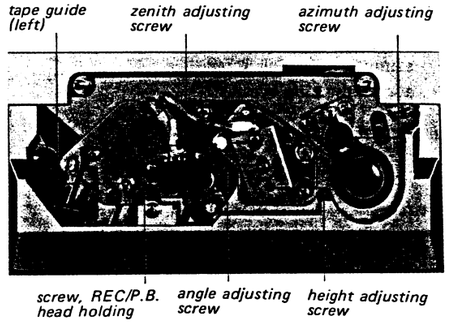


Fig. 9-2 Adjusting parts location (2)

9-1. Tape Pass Adjustment

(A) Tape Guide (left) Adjustment

Adjusting Parts:

tape guide (left) ..... See Fig. 9-2.

(1) Thread a tape.
(2) Align the upper edge of the tape just on the upper edge of the erase head core by turning the tape guide located on the left side of the erase head.
(3) Turn the tape guide located on the left side of the erase head clockwise by approximately 35° from the position obtained in the preceding procedures, so that the upper edge of the tape is approximately 0.05 mm lower than that of the erase head core.

(B) Tentative REC/P.B. Head Adjustment

Adjusting Parts:

azimuth adjusting screw, height adjusting screw, zenith adjusting screw ..... See Fig. 9-2.

Procedures:

(1) Thread a blank tape.
(2) Set the machine in FWD mode at the 19 cm/s (7½ ips) tape speed.
(3) Make the tape loose a little by pushing the tension regulator arm pin in the direction shown with the arrow in Fig. 9-3 and then adjust the zenith and azimuth adjusting screws to obtain the reflection of light as shown in Fig. 9-3.
(4) Turn the azimuth adjusting screw to be parallel the upper edge of the head core to that of the tape.
(5) Turn the height adjusting screw to align the upper edge of the head core and that of the tape and memorize the number of turns of the screw.
(6) Turn the zenith adjusting screw by the same number of the turns in the same direction of the height adjusting screw.
(7) Repeat the above procedures (5) and (6) to align the upper edge of the head core and that of the tape.
(8) Turn the height and zenith adjusting screws counterclockwise by approximately 20° from the position obtained in the preceding procedure (7) so that the upper edge of the head core is 0.025 mm lower than that of the tape.
(9) Be sure to obtain the reflection of light as shown in Fig. 9-3 on the tape at the head by pushing the tension regulator arm pin in the direction shown with the arrow in Fig. 9-3. If not, repeat the above procedures.

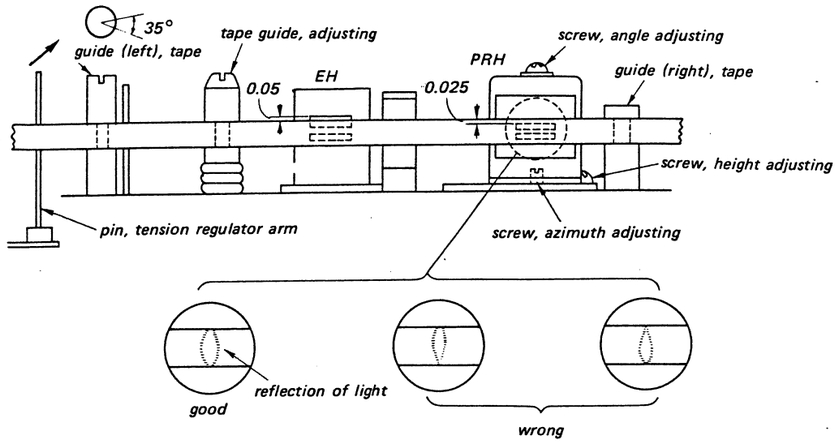


Fig. 9-3 Tape pass adjustment

9-2. Tape Curl Adjustment

Procedures:

(1) Set the machine at 4.8 cm/s (1⅞ ips) tape speed.
(2) Be sure that the tape comes in contact with the two tape guides exactly as shown in Fig. 9-4.
- If the tape is curled at the left tape guide, adjust by bending the tension regulator arm pin with fingers.
- If the tape is curled at the right tape guide, loosen the two capstan bearing holding screws and adjust by adding or removing the mylar spacer.

Note: After adding or removing the mylar spacer, perform the head zenith adjustment.

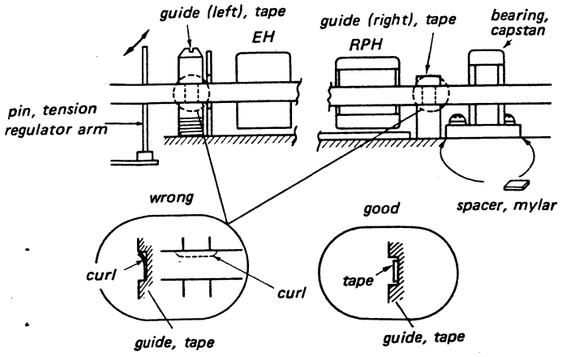


Fig. 9-4 Tape curl adjustment

9-3. REC/P.B. Head Azimuth & Angle Adjustments

Connections:

As shown in Fig. 9-5

Adjusting Parts:

azimuth adjusting screw
angle adjusting screws } ..... See Fig. 9-2

Switch Setting:

TAPE SPEED switch ..... 19 cm/s (7½ ips)

Procedures:

(1) Be sure that the head is secured sufficiently to the head deck with the holding screw shown in Fig. 9-2, and the tape pass adjustment has been made.
(2) Playback the 1st tone (10 kHz) of SONY alignment tape, J-19-F1 or J-19-K1.
(3) Adjust the azimuth adjusting screw with a non-magnetic screw driver to obtain the maximum reading on the VTVM in both L-CH and R-CH.
If the maximum value of R-CH is not the same as that of L-CH, adjust the screw to obtain the mean value of both L-CH and R-CH maximum readings.
(4) Adjust the angle of the head by loosening the two angle adjusting screws so that the output level is maximum and the level variation within 1 dB on the VTVM.
(5) Make the head azimuth adjustment again.

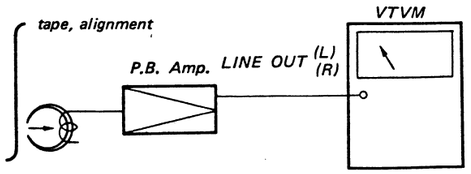


Fig. 9-5 REC/P.B. head azimuth & angle adjustment setup

9-4. REC/P.B. Head Phase Check

Connection:

As shown in Fig. 9-6

Procedures:

(1) Playback the 2nd tone (400 Hz) of SONY alignment tape J-19-F1 or J-19-K1.
(2) Make sure to obtain the Lissajous figure with no phase difference on the oscilloscope as shown in Fig. 9-7.
If not, make the head azimuth adjustment.

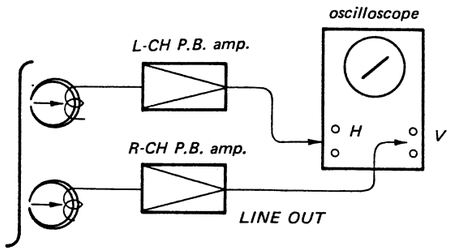


Fig. 9-6 REC/P.B. head phase check setup

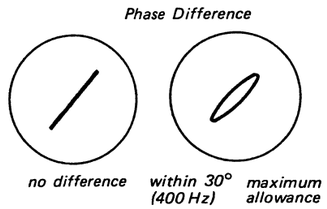


Fig. 9-7 Lissajous figures

9-5. P.B. Output Level Adjustment & Level Meter Calibration

Connection:

As shown in Fig. 9-8

Adjusting Parts:

R121 (R221) – p.b. output level adjustment ..... See Fig. 9-1
R136 (R236) – level meter calibration ..... See Fig. 9-1

Switch Setting:

TAPE SELECTOR switch .... NORMAL
TAPE SPEED switch ..... 19 cm/s (7½ ips)

Procedures:

(1) Playback the 2nd tone (400 Hz, 0 dB) of SONY alignment tape J-19-F1 or J-19-K1.
(2) Adjust R121 (R221) to obtain −0.5 ~ +0.5 dB (0.72 ~ 8.1 V) on the VTVM.
(3) Adjust R136 (R236) so that the pointer of the level meter just indicates the boundary between the red portion and the black portion.
(4) Change the TAPE SELECT switch to SLH.
(5) Be sure that the VTVM reading is −2 ~ −3 dB (0.61 ~ 0.55 V).

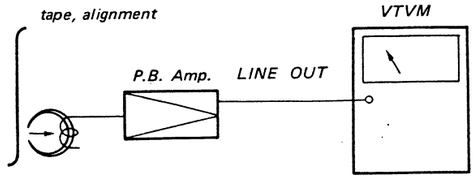


Fig. 9-8 P.B. output level adjustment & level meter calibration

9-6. P.B. Equalizer Adjustment

Connection:

As shown in Fig. 9-9

Adjusting Parts:

R119 (R219) – 19 cm/s (7½ ips) tape speed ..... See Fig. 9-1

Procedures:

A) In using the SONY alignment tape J-19-K1
(1) Set the TAPE SPEED switch to 19 cm/s (7½ ips) tape speed.
(2) Playback the 1st tone (10 kHz, −10 dB) of the tape and memorize the reading on the VTVM.
(3) Playback the 2nd tone (400 Hz, 0 dB) of the tape and adjust R119 (R219) so that the reading on the VTVM is 10 dB higher than the reading obtained in the preceding procedure (2).

B) In using the SONY alignment tape J-19-F1
(1) Set the TAPE SPEED switch to 19 cm/s (7½ ips) tape speed.
(2) Playback the 3rd tone (400 Hz, −10 dB) of the tape and memorize the reading on the VTVM.
(3) Playback the 4th tone (10 kHz, −10 dB) of the tape and adjust R119 (R219) so that the reading on the VTVM is the same as the reading obtained in preceding procedure (2).
(4) Be sure that the deviation of each tone against the 3rd tone (400 Hz) is within the value shown in the table (1).
(5) Change the TAPE SPEED switch from 19 cm/s (7½ ips) to 9.5 cm/s (3¾ ips).

(6) Be sure that the deviation of each tone against the 3rd tone (400 Hz) is within the value shown in the table (2).

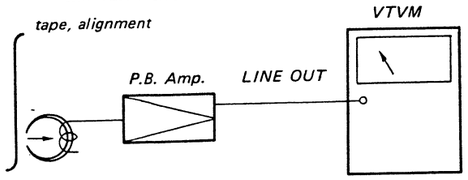


Fig. 9-9 P.B. equalizer adjustment setup

tape tone	4th	5th	6th	7th
frequency	10 kHz	7 kHz	80 Hz	40 Hz
deviation	0±0.5 dB	0±1.5 dB	2±1.5 dB	3±2 dB

Table (1): SONY alignment tape J-19-F1 (at 19 cm/s)

tape tone	4th	5th	6th	7th
frequency	5 kHz	3 kHz	200 Hz	80 Hz
deviation	0±2 dB	0±2 dB	1±2 dB	2±2 dB

Table (2): SONY alignment tape J-9-F1 (at 9.5 cm/s)

9-7. P.B. S/N Ratio Measurement

Connection:

As shown in Fig. 9-10

Adjusting Parts:

① joint terminal
② power transformer holding screw

Procedures:

(1) Playback the 2nd tone (400 Hz) of the SONY alignment tape J-19-F1 or J-19-K1 and be sure that the VTVM reading is 0 dB. If not, make the p.b. output level adjustment again.
(2) Set the machine at 19 cm/s (7½ips) tape speed in FWD mode with no tape, by pushing the shut-off lever with finger.
(3) Be sure that the VTVM reading is less than -49 dB (3 mV).
(4) S/N ratio will change by reversing the sense of motor and by moving the position of the power transformer.
Therefore, select the connection of the joint terminals connected to the motor leads and adjust the position of the power transformer by loosening the screw marked with ▲ in Fig. 9-11 for the best S/N ratio.

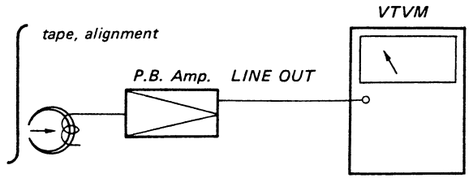


Fig. 9-10 P.B. S/N ratio measurement setup

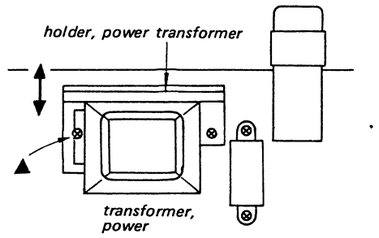


Fig. 9-11 Power transformer position adjustment

9-8. Trap Coil Adjustment (1)

Connection:

As shown in Fig. 9-12

Adjusting Parts:

L104 (L204) ..... See Fig. 9-1

Procedures:

(1) Connect the VTVM to the check points "P" indicated on the bias osc. & power supply circuit board on page 31.
(2) Turn the record level controls counterclockwise to the full.
(3) Push the shut-off arm pin during this adjustment.
(4) Place the machine in stereo-record mode.
(5) Adjust L104 (L204) to obtain the minimum reading on the VTVM.

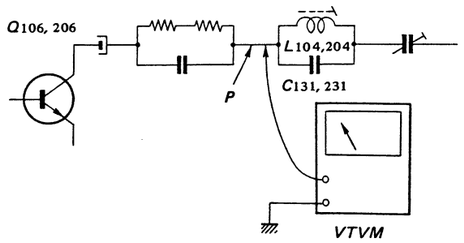


Fig. 9-12 Trap coil adjustment (1) setup

9-9. Trap Coil Adjustment (2)

Connections:

As shown in Fig. 9-13

Adjusting Parts:

L101 (L201) ..... See Fig. 9-1

Procedures:

(1) Turn the record level controls clockwise to the full.
(2) Set the L-CH (R-CH) only in record mode.
(3) Adjust L201 (L101) to obtain the minimum reading (less than -30 dB, 24.5 mV) on the VTVM.

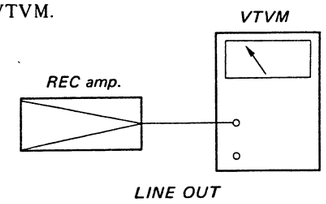


Fig. 9-13 Trap coil adjustment (2) setup

9-10. Record Bias Adjustment

Connections:

As shown in Fig. 9-14

Adjusting Parts:

C306 (C307) ..... See Fig. 9-1

REC Level Control Setting:

Indicated on page 14

Procedures:

(1) Be sure that the trap coil adjustment (1) has been made.
(2) Deliver a 1 kHz signal of -10 dB (0.24 V) into the AUX IN jack.
(3) Turn the trimmer capacitors, C306 & C307, clockwise to the full seeing from the conductor side of the circuit board.
(4) Thread a blank tape and place the machine in record mode.
(5) Set the tape index counter at "0000" by pushing the reset button.
(6) Memorize the reading on the tape index counter and the position of C306 (C307) at intervals of approximately 5 V on the VTVM, while turning C306 (C307) counterclockwise slowly.

Note:

(1) Connect the VTVM across the REC/P.B. head only when measuring them to prevent mismeasurements from the stray capacitance caused by the leads of the VTVM.
(2) Do not use the shielded wire as the leads of the VTVM.

(7) Rewind the tape.
(8) Playback the recorded portion of the tape and memorize the LINE OUT levels against each position of the tape index counter obtained in the step (6).
(9) Search out the position of C306 (C307) where is obtained the highest LINE OUT level and then set C306 (C307) to the point.

Note: As the peak point is obtained in fairly wide range, set C306 (C307) to the point where the least bias voltage is obtained.

(10) Record two 1 kHz and 15 kHz signals of -40 dB (7.75 mV) on the tape and playback them.
(11) Turn C306 (C307) counterclockwise so that the line output level at 15 kHz signal is +0.3 ~ -0.5 dB against the level at 1 kHz signal.
(12) After the adjustment, apply lock paint to C306 (C307).

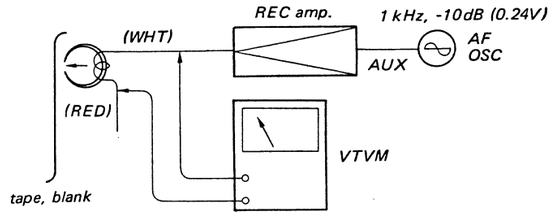


Fig. 9-14 Record bias adjustment setup

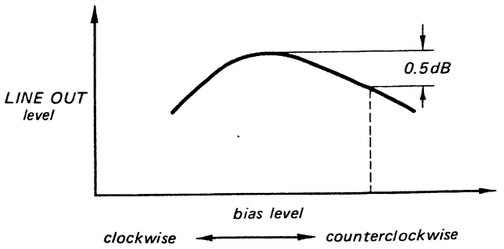


Fig. 9-15 Record bias characteristics

9-11. Record Level Adjustment

Connection:

As shown in Fig. 9-16

Adjusting Parts:

R137 (R237) ..... See Fig. 9-1

REC Level Control Setting:

Indicated on page 14

Procedures:

(1) Thread a blank tape.
(2) Deliver a 1 kHz signal of -10 dB (0.24 V) into the AUX IN jack and record the signal on the blank tape.

(3) Playback the tape.
(4) Adjust R137 (R237) so that the VTVM reading is 0 dB (0.775 V).
(5) Be sure that the level difference between channels is within 2 dB at 9.5 cm/s (3¾ ips) and 4.8 cm/s (1⅞ ips) tape speeds.
(6) Deliver a 1 kHz signal of -10 dB (0.24 V) into the AUX IN jack again.
(7) Set the L-CH (R-CH) only in record mode at 19 cm/s (7½ ips) tape speed and memorize the VTVM indication.
(8) Set the machine in stereo-record mode at 19 cm/s (7½ ips) tape speed and memorize the VTVM indication of L-CH (R-CH).
(9) Be sure that the level difference between step (7) and step (8) is within 1 dB.

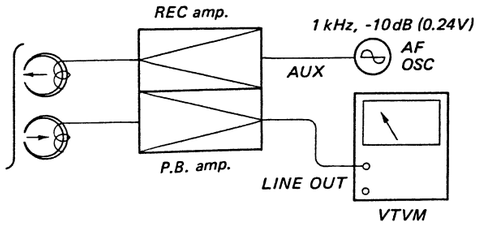


Fig. 9-16 Record level adjustment setup

9-12. Erase Ratio Measurement

Connection:

As shown in Fig. 9-17

REC Level Control Setting:

Indicated on page 14

Procedures:

(1) Thread a blank tape.
(2) Deliver a 1 kHz signal of 0 dB (0.775 V) into the AUX IN jack and record the signal on the blank tape.
(3) Rewind the tape and erase a part of the tape (record mode with no signal input).
(4) Memorize the VTVM reading on the recorded part and the erased part of the tape.
(5) Be sure that the ratio of the recorded part to the erased part is more than 70 dB in level. If not, perform the tape pass adjustment and be sure that the erasing current is 80 ~ 110 mA. To measure the erasing current, connect a 1 Ω resistor in series to the erase head as shown in Fig. 9-18 and the VTVM across the 1 Ω resistor.
Be sure that the VTVM reading is 80 ~ 110 mV.

Note: Take impedance-matching correctly for the band pass filter (BPF).

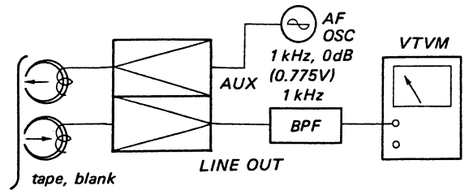


Fig. 9-17 Erase ratio measurement setup

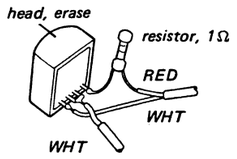


Fig. 9-18 Erasing current check setup

9-13. Wow and Flutter Measurement

Connection:

As shown in Fig. 9-19

Procedures:

(1) Prepare two SONY alignment tapes, WS-19-7 (for 19 cm/s) and WS-9-7 (for 9.5 cm/s).
(2) Record the 3 kHz signal near the end of the blank tape for 2 minutes, at 4.8 cm/s (1⅞ ips) tape speed to make the 4.8 cm/s alignment tape.
(3) Playback the alignment tapes and the tape recorded in step (2) for 30 seconds at the each tape speed and then set the machine in STOP mode.

Note: The measurement should be performed near the end of the each tape.

(4) Repeat the above step (3) by three times and take the each maximum values on the wow and flutter meter.
(5) Be sure that the maximum values for the each speed is within the values described in the table below.

TAPE SPEED	Allowable Limit
19 cm/s (7½ ips)	0.12% rms
9.5 cm/s (3¾ ips)	0.18% rms
4.8 cm/s (1⅞ ips)	0.30% rms

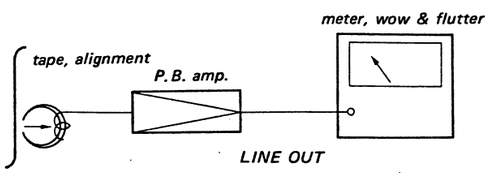


Fig. 9-19 Wow and flutter measurement setup

9-14. Overall Frequency Response Measurement

Connection:

As shown in Fig. 9-20

REC Level Control Setting:

Indicated on page 14

Procedures:

(1) Thread a blank tape.
(2) Deliver a 1 kHz signal of -40 dB (7.75 mV) into the AUX IN jack and record the signal on the blank tape.
(3) Playback the tape and memorize the VTVM reading.
(4) Deliver 40 Hz, 70 Hz, 4 kHz, 7 kHz, 10 kHz, 15 kHz and 18 kHz signals of -40 dB (7.75 mV) in turn into the AUX IN jack and record them on the blank tape.
(5) Playback the tape portion recorded in the step (4) and memorize the VTVM reading respectively.
(6) Be sure that each deviation in level against 1 kHz signal is within the values shown in the table below.
If not, perform the record bias adjustment.

frequency / tape speed	40Hz	70Hz	4kHz	7kHz	10kHz	15kHz	18kHz
19 cm/s (7½ ips)	$^{+2}_{-5}$ dB	$^{+2}_{-3}$ dB	$^{+2}_{-3}$ dB	$^{+2}_{-3}$ dB	$^{+2}_{-3}$ dB	$^{+2}_{-3}$ dB	$^{+2}_{-4}$ dB
9.5 cm/s (3¾ ips)	$^{+3}_{-6}$ dB	$^{+3}_{-3}$ dB	$^{+3}_{-3}$ dB	$^{+3}_{-3}$ dB	$^{+3}_{-6}$ dB		
4.8 cm/s (1⅞ ips)	$^{+3}_{-7}$ dB	$^{+3}_{-3}$ dB	$^{+3}_{-3}$ dB	$^{+3}_{-7}$ dB			

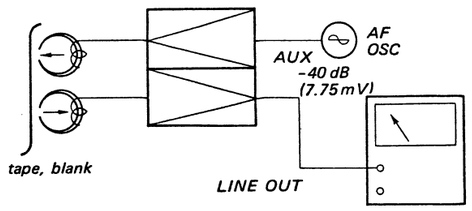


Fig. 9-20 Overall frequency response measurement setup

9-15. Overall S/N Ratio Measurement

Connection:

As shown in Fig. 9-21

REC Level Control Setting:

Indicated on page 14

Procedures:

(1) Thread a blank tape.
(2) Deliver a 1 kHz signal of -10 dB (0.24 V) into the AUX IN jack and record the signal on the blank tape.
(3) Playback the tape and memorize the VTVM reading.
(4) Remove the input connection of the audio generator and terminate the MIC and the AUX IN jacks with the dummy resistors (MIC ·····600Ω, AUX ·····10 kΩ).
(5) Rewind the recorded tape and erase a part of the recorded tape (record mode with no signal input).
(6) Be sure that the ratio of the recorded part of the tape to the erased part is more than 45 dB at 19 cm/s (7½ ips) tape speed and 44 dB at 9.5 cm/s (3¾ ips) tape speed on the VTVM.

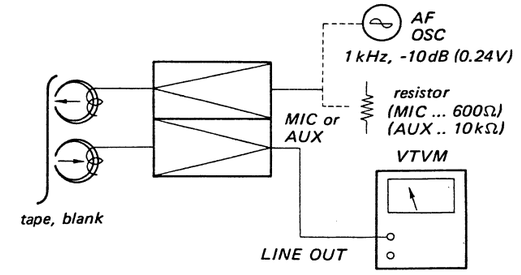


Fig. 9-21 Overall S/N ratio measurement setup

9-16. Distortion Measurement

Connection:

As shown in Fig. 9-22

REC Level Control Setting:

Indicated on page 14

Procedures:

(1) Thread a blank tape.
(2) Deliver a 1 kHz signal of -10 dB (0.24 V) into the AUX IN jack and record the signal on the blank tape.
(3) Playback the tape and be sure that the reading on the distortion meter is within 1.8% at 19 cm/s (7½ ips) tape speed.

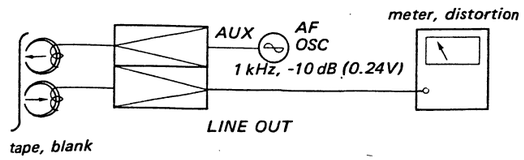


Fig. 9-22 Distortion measurement setup

9-17. Cross-talk Measurement (between channels)

Connection:

As shown in Fig. 9-23

REC Level Control Setting:

Indicated on page 14

Procedures:

(1) Thread a blank tape.
(2) Place the machine in stereo-record mode.
(3) Deliver a 1 kHz signal of 0 dB (0.775 V) into the L-CH (R-CH) AUX IN jack only.
(4) Playback the tape.
(5) Be sure that the ratio of the L-CH (R-CH) LINE OUT to the R-CH (L-CH) LINE OUT is more than 55 dB on the VTVM.

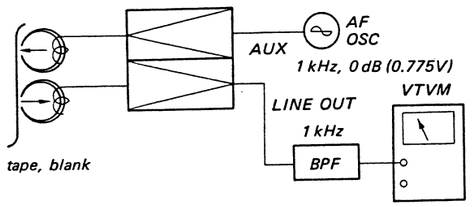


Fig. 9-23 Cross-talk measurement setup (between channels)

9-18. Cross-talk Measurement (between tracks)

Connection:

As shown in Fig. 9-24

REC Level Control Setting:

Indicated on page 14

Procedures:

(1) Thread a blank tape.
(2) Place the machine in stereo-record mode.
(3) Deliver a 1 kHz signal of +0 dB (0.775V) into the L-CH & R-CH AUX IN jacks and record the signal on the blank tape.
(4) Playback the tape and memorize the L-CH or R-CH VTVM reading, and then take up the tape.
(5) Turn the recorded tape upside down and put it on the supply reel table.
(6) Playback the recorded portion of the tape in the step (3) and memorize the L-CH or the R-CH VTVM reading.
(7) Be sure that the ratio of the VTVM reading obtained in the step (4) to the VTVM reading obtained in the step (6) is more than 70 dB (Variation Limit: within 5 dB).

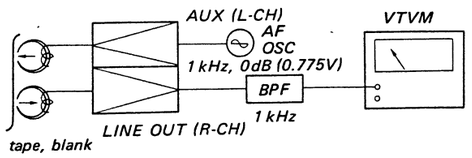


Fig. 9-24 Cross-talk measurement setup (between tracks)

9-19. Input & Output Level Checks of REC/P.B. Connector

Connection:

As shown in Fig.9-25.

REC Level Control Setting:

Indicated on page 14

Procedures:

(1) Deliver a 1 kHz signal of -33 dB (17.5 mV) to terminal No. ① (L-CH) or ④ (R-CH) of the rec./p.b. connector shown in Fig. 9-26.
(2) Place the machine in record mode and be sure that the pointer of the level meter indicates the boundary between the red portion and the black portion.
(3) Record the signal on the blank tape.
(4) Playback the tape.
(5) Be sure that the reading on the VTVM connected to the terminal No. ③ (L-CH) or ⑤ (R-CH) of the rec./p.b. connector is -1 ~ +1 dB (0.69 ~ 0.87 V).

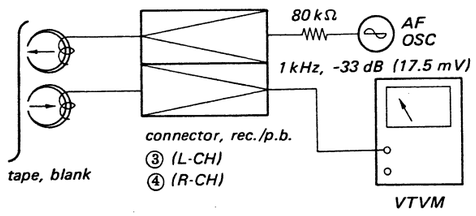


Fig. 9-25 Input & output level checks setup of REC/P.B. Connector

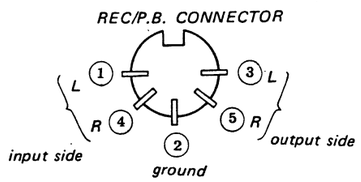


Fig. 9-26 REC/P.B. connector (back view)

10. CONVERSION TO DIFFERENT POWER LINE FREQUENCY

If the deck is to be operated on a line frequency different from the frequency for which the deck is adjusted, it may be easily converted. (Remove the reel panel for access.)

FIRST: Using a screw-driver, turn the line frequency switch (S304) to the correct position for the power to be used (50 or 60 Hz). See Fig. 10-1.

SECOND: Replace the motor pulley as follows:

1. Remove the Instant Stop adjusting plate and withdraw the Instant Stop pull rod.
2. Remove the two screws which hold the motor pulley and take off the pulley of its shaft.
3. Replace the motor pulley with the correct diameter pulley for the line frequency to be used. ALWAYS replace the pulley with the same marking (i.e., "+3") as the one you removed. (This identification mark indicates a fine speed tolerance diameter.)
4. After reassembling the motor pulley, make the instant stop adjustment (Refer to page 13).

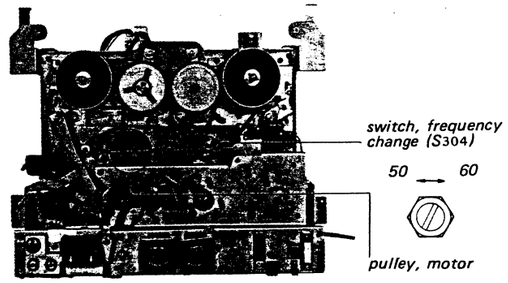


Fig. 10-1 Parts location

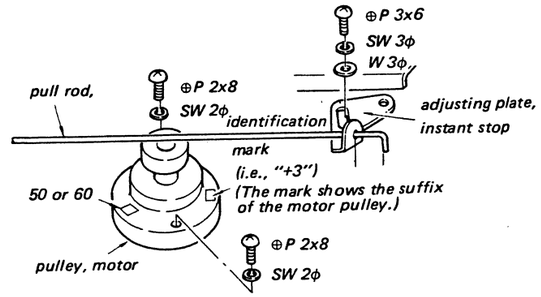


Fig. 10-2 Motor pulley replacement

Motor Pulley Part No.			
for 50 Hz		for 60 Hz	
Identification Mark on Motor Pulley	Part No.	Identification Mark on Motor Pulley	Part No.
+3	3-472-184-61	+3	3-472-185-61
+2	3-472-184-51	+2	3-472-185-51
+1	3-472-184-41	+1	3-472-185-41
+0.5	3-472-184-71	+0.5	3-472-185-71
0	3-472-184-01	0	3-472-185-01
-0.5	3-472-184-81	- 0.5	3-472-185-81
-1	3-472-184-11	- 1	3-472-185-11
-2	3-472-184-21	- 2	3-472-185-21
-3	3-472-184-31	- 3	3-472-185-31

10. CONVERSION TO DIFFERENT POWER LINE FREQUENCY

If the deck is to be operated on a line frequency different from the frequency for which the deck is adjusted, it may be easily converted. (Remove the reel panel for access.)

FIRST: Using a screw-driver, turn the line frequency switch (S304) to the correct position for the power to be used (50 or 60 Hz). See Fig. 10-1.

SECOND: Replace the motor pulley as follows:

1. Remove the Instant Stop adjusting plate and withdraw the Instant Stop pull rod.
2. Remove the two screws which hold the motor pulley and take off the pulley of its shaft.
3. Replace the motor pulley with the correct diameter pulley for the line frequency to be used. ALWAYS replace the pulley with the same marking (i.e., "+3") as the one you removed. (This identification mark indicates a fine speed tolerance diameter.)
4. After reassembling the motor pulley, make the instant stop adjustment (Refer to page 13).

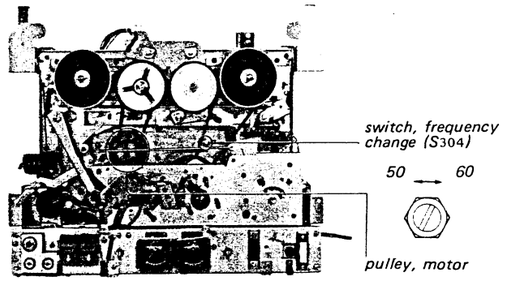


Fig. 10-1 Parts location

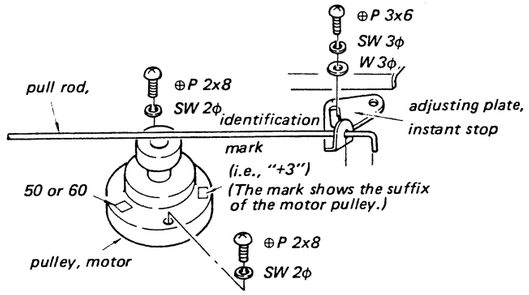
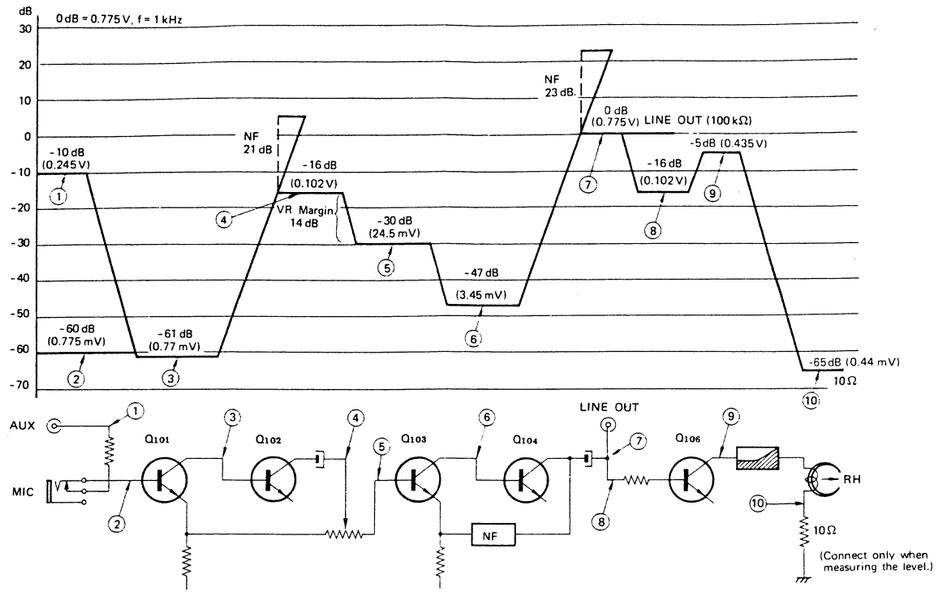


Fig. 10-2 Motor pulley replacement

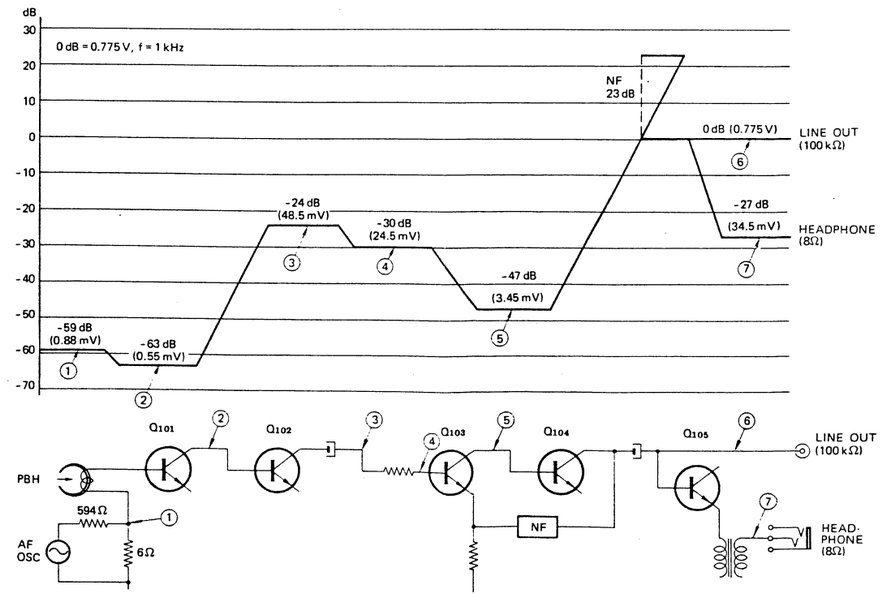
Motor Pulley Part No.			
for 50 Hz		for 60 Hz	
Identification Mark on Motor Pulley	Part No.	Identification Mark on Motor Pulley	Part No.
+3	3-472-184-61	+3	3-472-185-61
+2	3-472-184-51	+2	3-472-185-51
+1	3-472-184-41	+1	3-472-185-41
+0.5	3-472-184-71	+0.5	3-472-185-71
0	3-472-184-01	0	3-472-185-01
-0.5	3-472-184-81	- 0.5	3-472-185-81
-1	3-472-184-11	- 1	3-472-185-11
-2	3-472-184-21	- 2	3-472-185-21
-3	3-472-184-31	- 3	3-472-185-31

11. LEVEL DIAGRAM

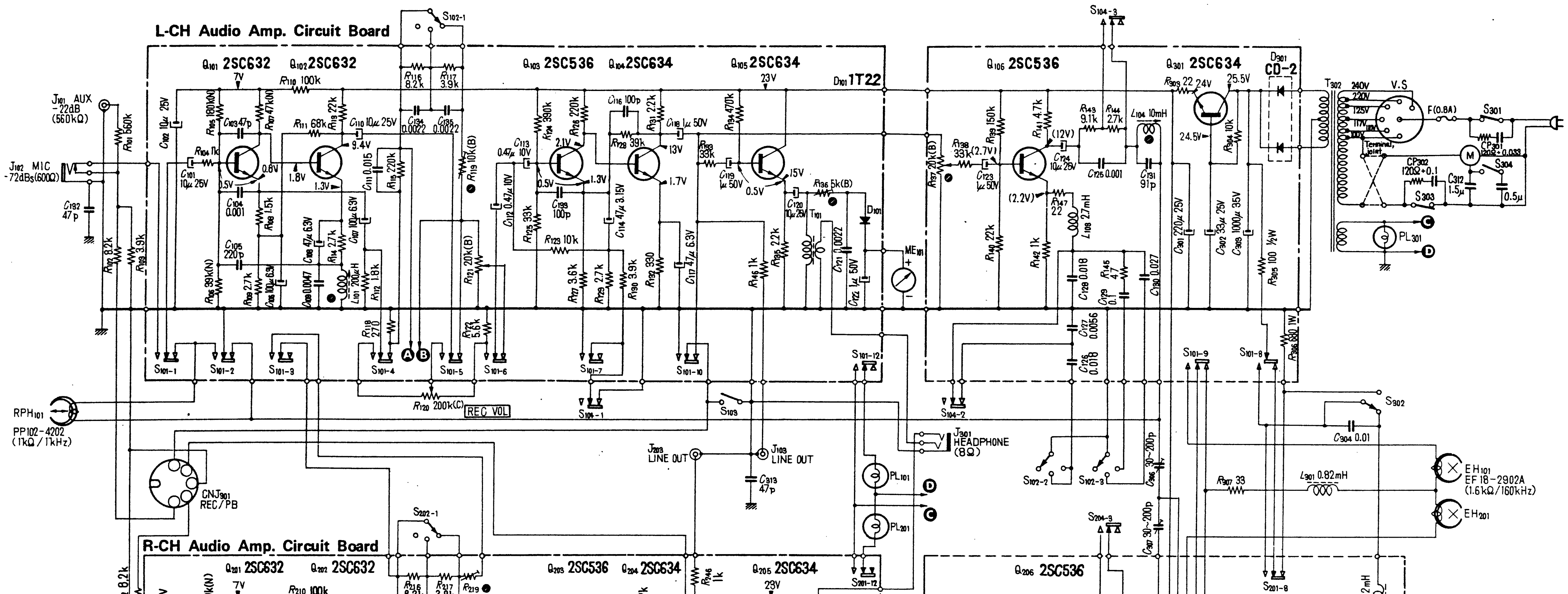
11-1. Record

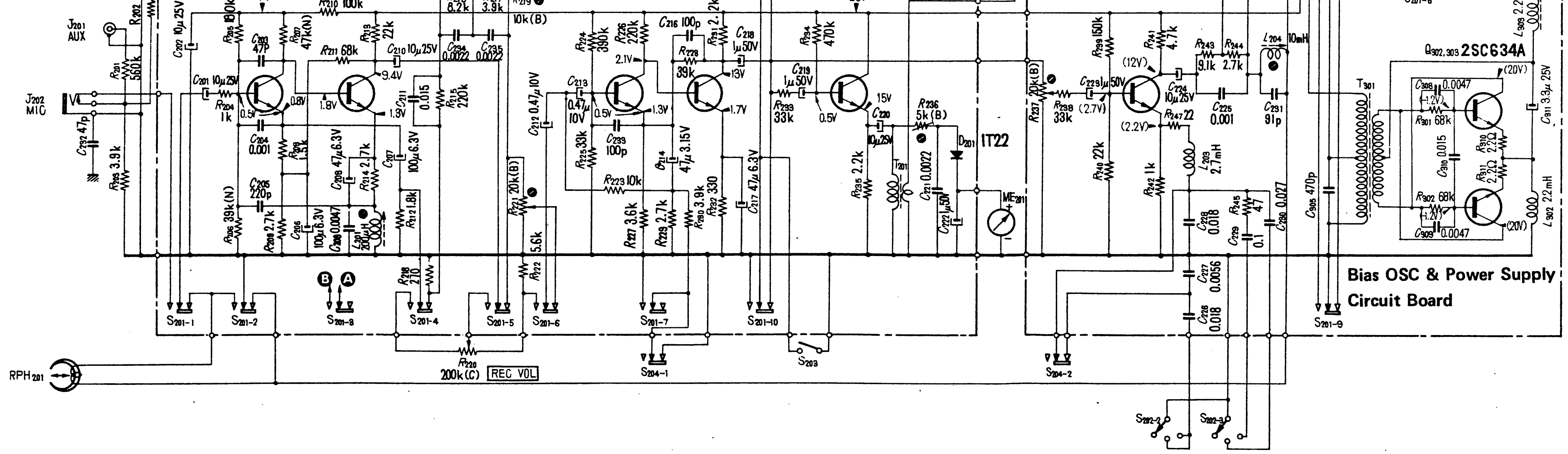


11-2. Playback



12. SCHEMATIC DIAGRAM


L-CH Audio Amp. Circuit Board
Q101 2SC632
Q102 2SC632
Q103 2SC536
Q104 2SC634
Q105 2SC634
D101 1T22
Q106 2SC536
Q301 2SC634
D301 CD-2
S102-1
S104-3
J101 AUX -22dB (560kΩ)
J102 MIC -72dBs(600Ω)
T302
240V
220V
125V
117V
100V
V.S
F(0.8A)
S301
CP301 120Ω+0.033
S304
CP302 120Ω+0.1
C312 1.5μ
S303
0.5μ
PL301
S101-1
S101-2
S101-3
S101-4
S101-5
S101-6
S101-7
S101-10
S101-12
S101-9
S101-8
S104-1
S104-2
S103
R120 200k(C) REC VOL
RPH101 PP102-4202 (1kΩ/1kHz)
CNJ901 REC/PB
J203 LINE OUT
J103 LINE OUT
J301 HEADPHONE (8Ω)
PL101
PL201
S102-2
S102-3
S302
C304 0.01
R307 33
L301 0.82mH
EH101 EF 18-2902A (1.6kΩ/160kHz)
EH201


R-CH Audio Amp. Circuit Board
S202-1
Q201 2SC632
Q202 2SC632
Q203 2SC536
Q204 2SC634
Q205 2SC634
D201 1T22
Q206 2SC536
Q302, 303 2SC634A
T301
J201 AUX
J202 MIC
S201-1
S201-2
S201-8
S201-4
S201-5
S201-6
S201-7
S201-10
S201-12
S201-9
S204-1
S204-2
S204-3
S203
R220 200k(C) REC VOL
RPH201
S202-2
S202-3
Bias OSC & Power Supply Circuit Board

Notes:

(1) The positions of the switches in this diagram are as follows.

Switch No.	Description	Position
S101, 201	Rec./P.B. Switch	Playback
S102, 202	Equalizer Switch	19 cm/s (7½ ips)
S103, 203	Muting Switch	OFF
S104, 204	Tape Selector Switch	Normal
S301	Power ON/OFF Switch	ON
S302	Bias Oscillator Switch	ON
S303	Motor Shut-off Switch	ON
S304	Frequency Change Switch	60 Hz

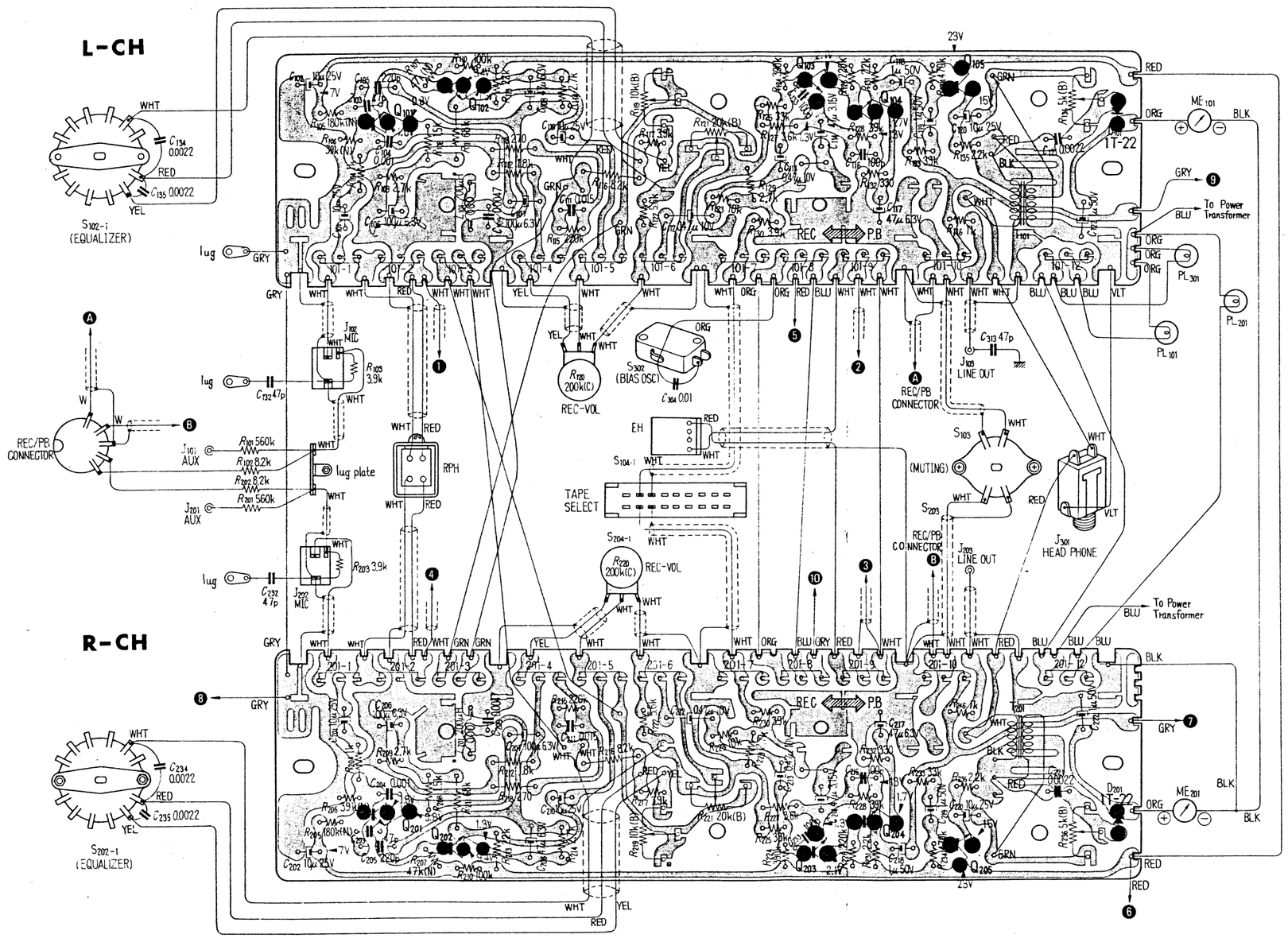
(2) The voltage values are measured with a voltmeter (20 kΩ/V) in playback mode.
The voltage values in parentheses are measured in record mode.
Variations may be noted because of normal production tolerances.

(3) ⊘ : indicates the adjustable parts.

13. MOUNTING DIAGRAM

13-1. Audio Amp. Circuit Boards

– Conductor Side –



L-CH Audio Amp. Circuit Board
Part No.: 1-539-411-11

R-CH Audio Amp. Circuit Board
Part No.: 1-539-412-11

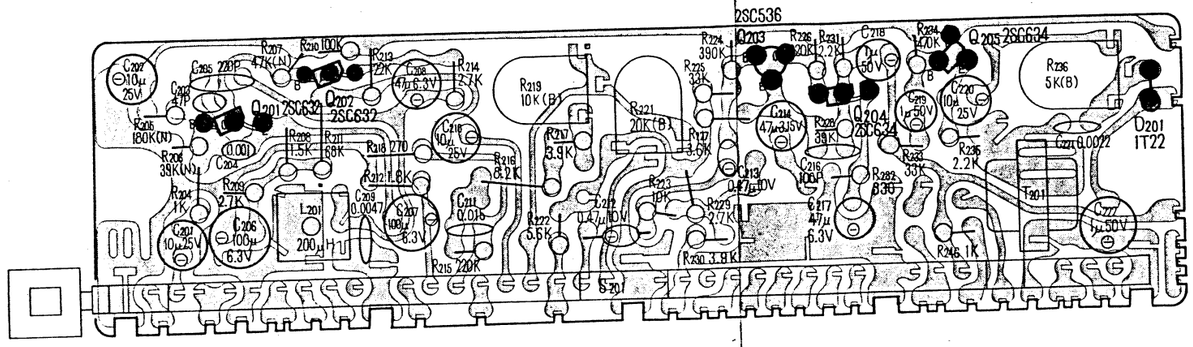
Notes:

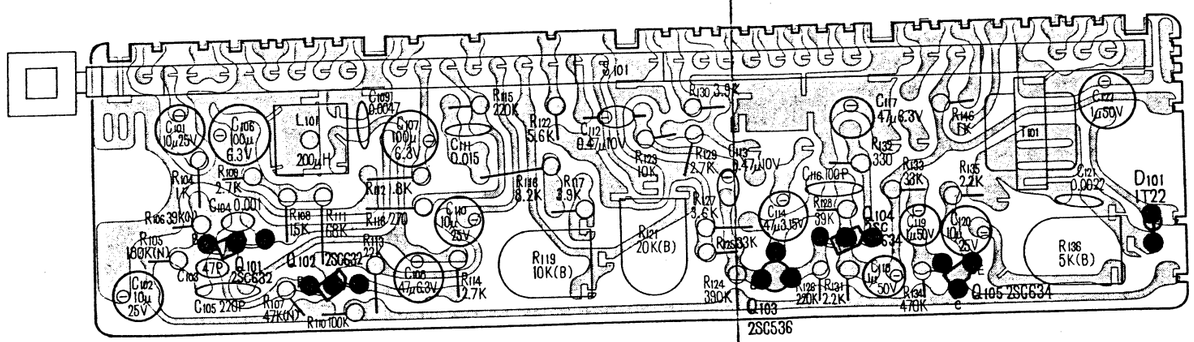
(1) The leads indicated with ❶ ~ ❿ are to be connected to the Bias OSC & Power Supply Circuit Board.

(2) The letter (N) which is suffixed to resistance values shows a low-noise resistor.

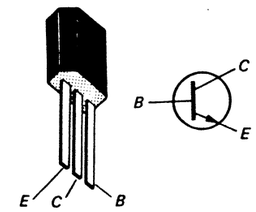
13-1. Audio Amp. Circuit Boards

— Component Side —

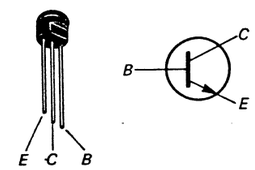




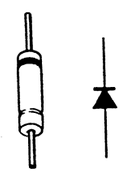
2SC632, 2SC634

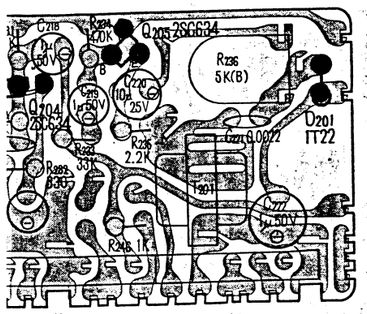


2SC536

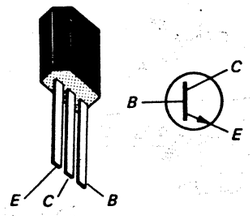


1T22

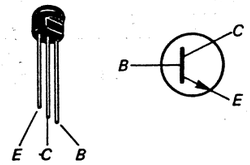


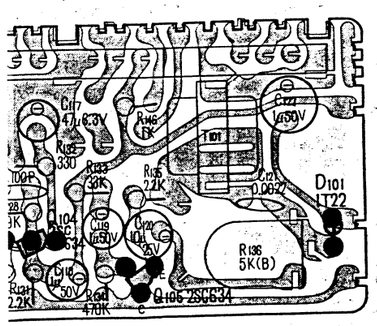


2SC632, 2SC634

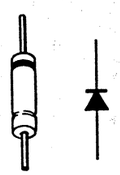


2SC536



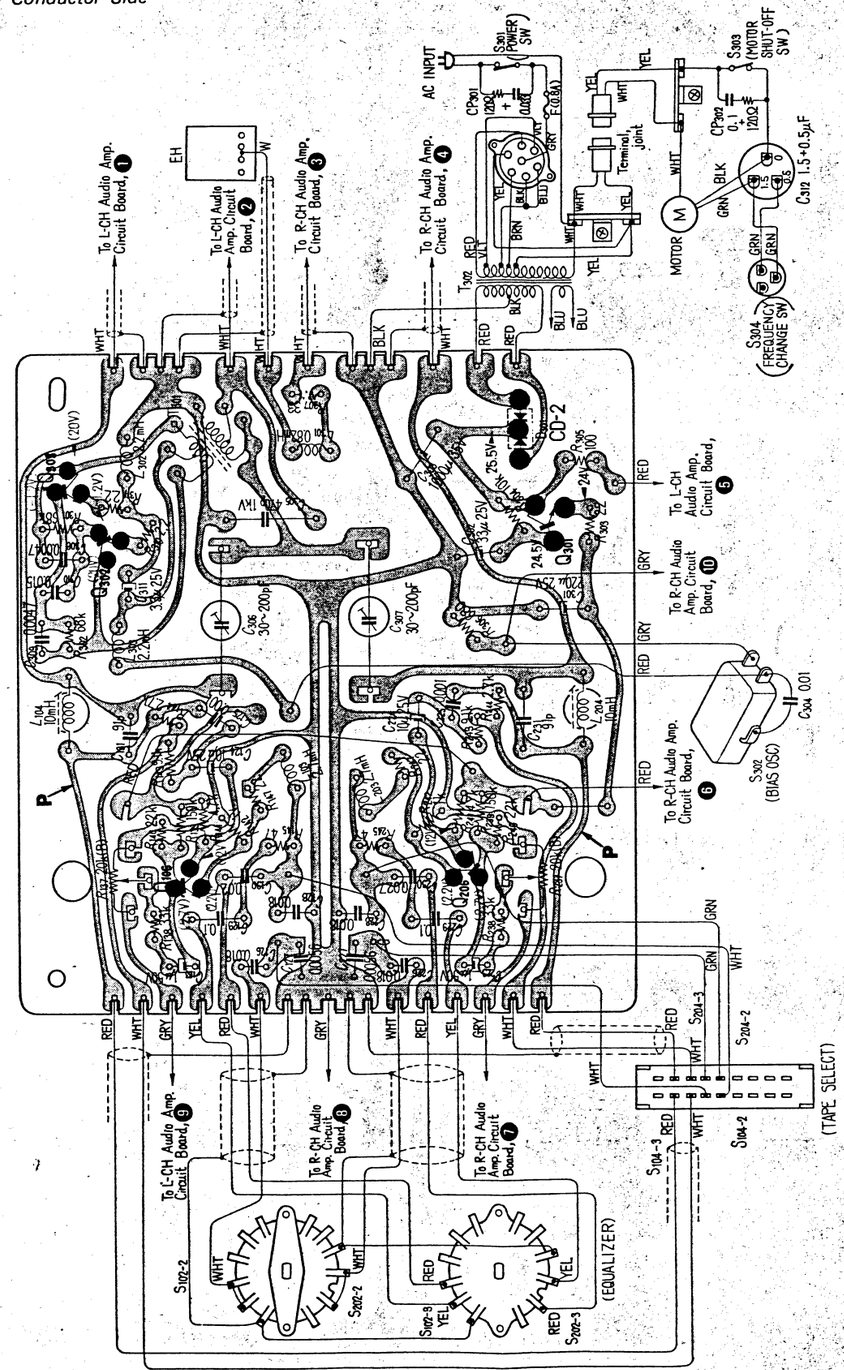


1T22



13-2. Bias OSC & Power Supply Circuit Board

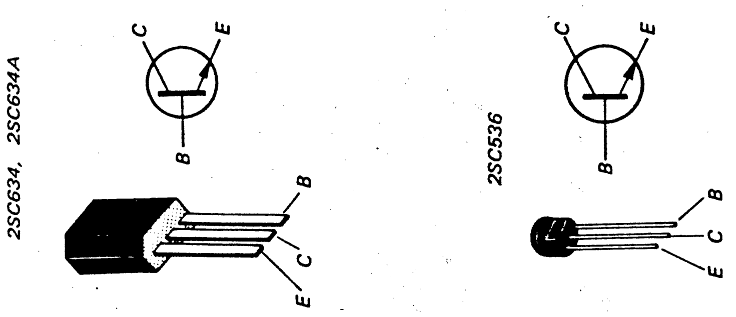
— Conductor Side —

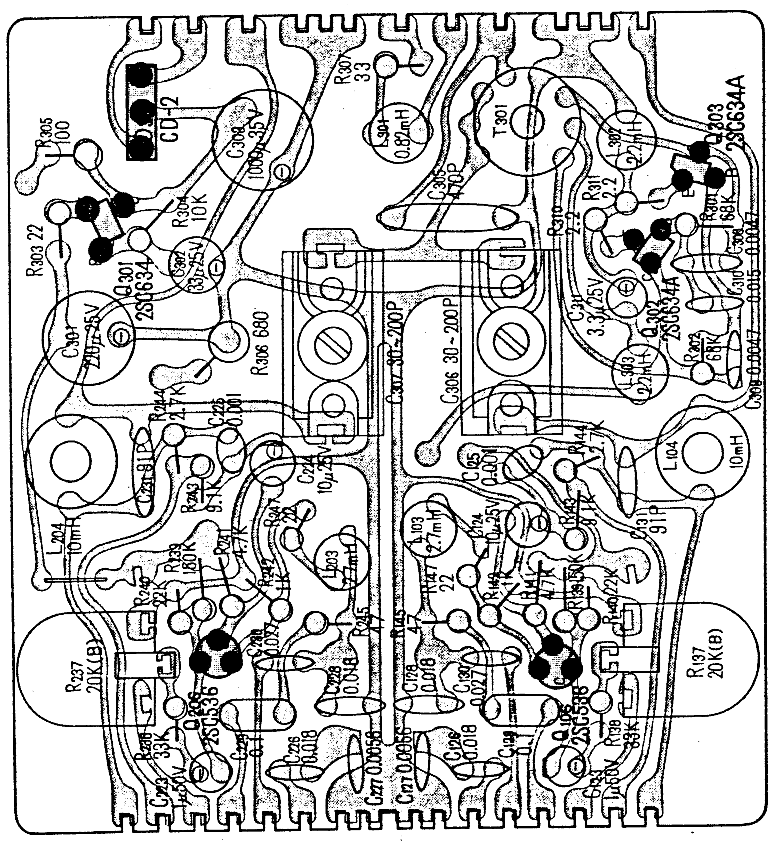


Printed Circuit Board
Part No.: 1-539-413-11

13-2. Bias OSC & Power Supply Circuit Board

– Component Side –





14. ELECTRICAL PARTS LIST

Ref. No.	*Part No.*	*Description*		
	Mounted Circuit Boards			
	X-34736-51-1	L-CH audio amp.		
	X-34736-52-1	R-CH audio amp.		
	X-34736-53-1	bias osc & power supply		
		Semiconductors		
Q101, 201		transistor	2SC632	
Q102, 202		transistor	2SC632	
Q103, 203	1-801-313	transistor	2SC536	
Q104, 204		transistor	2SC634	
Q105, 205		transistor	2SC634	
Q106, 206		transistor	2SC536	
Q301		transistor	2SC634	
Q302		transistor	2SC634A	
Q303		transistor	2SC634A	
D101, 201		diode	1T22	
D301		diode	CD-2	
		Coils		
L101, 201	1-409-083	trap, 200μH		
L102, 202		– discarded –		
L103, 203	1-407-199	equalizer, 2.7 mH		
L104, 204	1-407-290	trap, 10 mH		
L301	1-407-194	micro inductor, 0.82 mH		
L302	1-407-198	micro inductor, 2.2 mH		
L303	1-407-198	micro inductor, 2.2 mH		
		Transformers		
T101, 201	1-427-217	output		
T301	1-433-142	bias osc.		
T302	1-441-578	power		
		Capacitors		
C101, 201	1-121-398	10μF	25V,	electrolytic
C102, 202	1-121-398	10μF	25V,	electrolytic
C103, 203	1-107-123	470 pF	50V,	silvered mica
C104, 204	1-105-661-12	0.001μF	50V,	mylar
C105, 205	1-107-139	220 pF	50V,	silvered mica
C106, 206	1-121-413	100μF	6.3V,	electrolytic
C107, 207	1-121-413	100μF	6.3V,	electrolytic
C108, 208	1-121-407	47μF	6.3V,	electrolytic
C109, 209	1-105-669-12	0.0047μF	50V,	mylar
C110, 210	1-121-398	10μF	25V,	electrolytic
C111, 211	1-105-675-12	0.015μF	50V,	mylar
C112, 212	1-127-022	0.47μF	10V,	electrolytic
C113, 213	1-127-022	0.47μF	10V,	electrolytic
C114, 214	1-121-406	47μF	3.15V,	electrolytic
C115, 215		– discarded –		
C116, 216	1-107-131	100 pF	50V,	silvered mica
C117, 217	1-121-407	47μF	6.3V,	electrolytic
C118, 218	1-121-391	1μF	50V,	electrolytic
C119, 219	1-121-391	1μF	50V,	electrolytic
C120, 220	1-121-398	10μF	25V,	electrolytic

Ref. No.	*Part No.*	*Description*		
C121, 221	1-105-825-12	0.0022μF	50V,	mylar
C122, 222	1-121-381	1μF	50V,	electrolytic
C123, 223	1-121-381	1μF	50V,	electrolytic
C124, 224	1-121-398	10μF	25V,	electrolytic
C125, 225	1-105-661-12	0.001μF	50V,	mylar
C126, 226	1-106-031-12	0.018μF	50V,	mylar
C127, 227	1-106-019-12	0.0056μF	50V,	mylar
C128, 228	1-106-031-12	0.018μF	50V,	mylar
C129, 229	1-105-685-12	0.1μF	50V,	mylar
C130, 230	1-106-035-12	0.027μF	50V,	mylar
C131, 231	1-107-168	91 pF	500V,	silvered mica
C132, 232	1-107-123	47 pF	50V,	silvered mica
C133, 233	1-107-131	100 pF	50V,	silvered mica
C134, 234	1-106-066-12	0.0022μF	50V,	mylar
C135, 235	1-106-066-12	0.0022μF	50V,	mylar
C301	1-121-422	220μF	25V,	electrolytic
C302	1-121-404	33μF	25V,	electrolytic
C303	1-121-388	1,000μF	35V,	electrolytic
C304	1-105-753-12	0.01μF	200V,	mylar
C305	1-107-251	470 pF	1 kV,	mica
C306	1-141-010	30~200 pF		trimmer
C307	1-141-010	30~200 pF		trimmer
C308	1-106-359-12	0.0047μF	200V,	mylar
C309	1-106-359-12	0.0047μF	200V,	mylar
C310	1-106-086-12	0.015μF	50V,	mylar
C311	1-121-392	3.3μF	25V,	electrolytic
C312	1-117-036	1.5+0.5μF		MP
C313	1-107-123	47 pF	50V,	silvered mica

Resistors

All resistors are 1/4 W and carbon type, unless otherwise indicated.

R101, 201	1-244-739	560 kΩ	
R102, 202	1-244-695	8.2 kΩ	
R103, 203	1-242-687	3.9 kΩ	
R104, 204	1-242-673	1 kΩ	
R105, 205	1-242-727	180 kΩ	
R106, 206	1-242-711	39 kΩ	
R107, 207	1-242-713	47 kΩ	
R108, 208	1-242-677	1.5 kΩ	
R109, 209	1-242-683	2.7 kΩ	
R110, 210	1-242-721	100 kΩ	
R111, 211	1-242-717	68 kΩ	
R112, 212	1-242-679	1.8 kΩ	
R113, 213	1-242-705	22 kΩ	
R114, 214	1-242-683	2.7 kΩ	
R115, 215	1-242-729	220 kΩ	
R116, 216	1-242-695	8.2 kΩ	
R117, 217	1-242-687	3.9 kΩ	
R118, 218	1-242-659	270Ω	
R119, 219	1-221-401	10 kΩ (B)	semi-fixed
R120, 220	1-222-318	200 kΩ (C)	variable
R121, 221	1-222-952	20 kΩ (B)	semi-fixed
R122, 222	1-242-691	5.6 kΩ	

Ref. No.	Part No.	Description	
R123, 223	1-242-697	10 kΩ	
R124, 224	1-242-735	390 kΩ	
R125, 225	1-242-709	33 kΩ	
R126, 226	1-242-729	220 kΩ	
R127, 227	1-242-686	3.6 kΩ	
R128, 228	1-242-711	39 kΩ	
R129, 229	1-242-683	2.7 kΩ	
R130, 230	1-242-687	3.9 kΩ	
R131, 231	1-242-681	2.2 kΩ	
R132, 232	1-242-661	330Ω	
R133, 233	1-242-709	33 kΩ	
R134, 234	1-242-737	470 kΩ	
R135, 235	1-242-681	2.2 kΩ	
R136, 236	1-221-748	5 kΩ (B)	semi-fixed
R137, 237	1-221-952	20 kΩ (B)	semi-fixed
R138, 238	1-242-709	33 kΩ	
R139, 239	1-242-725	150 kΩ	
R140, 240	1-242-705	22 kΩ	
R141, 241	1-242-689	4.7 kΩ	
R142, 242	1-242-673	1 kΩ	
R143, 243	1-242-696	9.1 kΩ	
R144, 244	1-242-683	2.7 kΩ	
R145, 245	1-242-641	47Ω	
R146, 246	1-242-673	1 kΩ	
R147, 247	1-242-633	22Ω	
R301	1-242-717	68 kΩ	
R302	1-242-717	68 kΩ	
R303	1-242-633	22Ω	
R304	1-242-697	10 kΩ	
R305	1-244-849	100Ω	½W
R306	1-209-221	680Ω	1W
R307	1-242-637	33Ω	
R310	1-242-609	2.2Ω	
R311	1-242-609	2.2Ω	
Switches			
S101, 201	1-514-656	rec./p.b.	
S102, 202	1-514-657	equalizer	
S103, 203	1-514-643	muting	
S104, 204	1-514-642	tape selector	

Ref. No.	Part No.	Description
S301	1-514-655	power on/off
S302	1-514-231	bias oscillator
S303	1-514-039	motor shut-off
S304	1-514-512	frequency change
Jacks		
J101, 201	1-507-142	AUX IN
J102, 202	1-507-251	MIC
J103, 203	1-507-142	LINE OUT
J301	1-507-282	HEADPHONE
Heads		
EH101, 201	8-826-629-25	erase (EF18-2902A1)
RPH 101/201	8-829-142-20	rec./p.b. (PP102-4202)
Encapsulated Components		
CP301	1-231-057	0.033μF + 120Ω 500V
CP302	1-101-534	0.1μF + 120Ω 500V
Miscellaneous		
CNJ301	1-509-359	connector, rec./p.b.
M	8-832-624-09	motor (IC-624H1)
ME101, 201	1-524-062-00	meter, level
PL 101, 201/301	1-518-093-21	lamp, pilot
F	1-532-096	fuse, 0.8A
VS	1-509-064	socket, power voltage selector
	1-533-006	holder, fuse
	1-507-323	terminal, joint
	1-506-312	terminal, joint
	1-534-487-22	cord, power
	1-536-146	lug, terminal strip 1-L-1
	1-539-411-11	printed circuit board, L-CH audio amp.
	1-539-412-11	printed circuit board, R-CH audio amp.
	1-539-413-11	printed circuit board, bias osc. & power supply

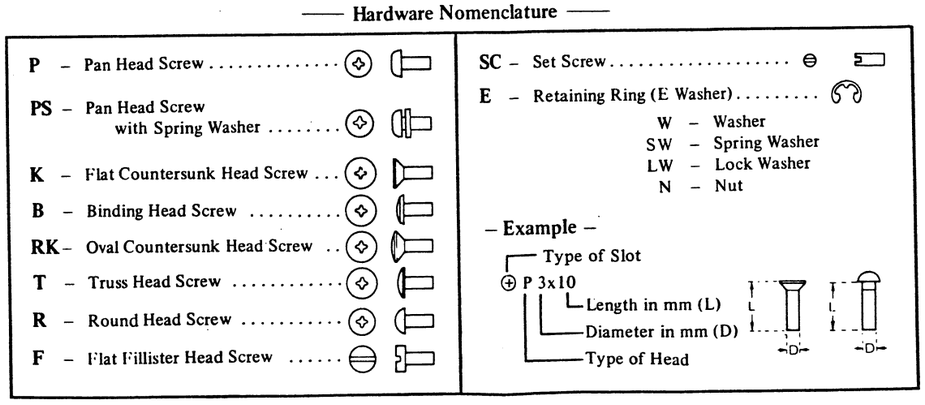
When ordering replacement parts, you should use PART NUMBER listed on the Parts Lists or shown in the EXPLODED VIEW. The reference number should not be used for ordering purposes.

15. HARDWARES

Part No.	Description
SCREWS	
7-621-259-25	⊕ P 2.6 x 4
7-621-259-35	⊕ P 2.6 x 5
7-621-259-65	⊕ P 2.6 x 10
7-621-560-52	⊕ K 2.6 x 22
7-621-770-64	⊕ B 2.6 x 8
7-621-771-33	⊕ B 2.6 x 5
7-628-254-05	⊕ PS 2.6 x 5
7-628-254-15	⊕ PS 2.6 x 6
7-628-254-35	⊕ PS 2.6 x 10
7-628-254-45	⊕ PS 2.6 x 12
7-682-145-01	⊕ P 3 x 4
7-682-147-01	⊕ P 3 x 6
7-682-148-01	⊕ P 3 x 8
7-682-149-01	⊕ P 3 x 10
7-682-160-01	⊕ P 4 x 6
7-682-161-01	⊕ P 4 x 8
7-682-466-13	⊕ T 4 x 20
7-682-548-13	⊕ B 3 x 8
7-682-550-14	⊕ B 3 x 12
7-682-562-13	⊕ B 4 x 10
7-682-624-01	⊕ PS 2 x 4
7-682-627-01	⊕ PS 2 x 8
7-682-646-01	⊕ PS 3 x 5
7-682-647-01	⊕ PS 3 x 6
7-682-648-01	⊕ PS 3 x 8
7-682-652-01	⊕ PS 3 x 16
7-682-661-01	⊕ PS 4 x 8
7-683-140-01	⊕ SC 3 x 6
7-685-145-31	TA ⊕ P 3 x 6
7-685-146-01	TA ⊕ P 3 x 8

Part No.	Description
NUT	
7-622-108-02	3φ
WASHERS	
7-623-105-12	2φ
7-623-107-02	2.6φ (small)
7-623-107-22	2.6φ
7-623-108-02	3φ (small)
7-623-108-12	3φ (Ni)
7-623-108-18	3φ (Cr)
7-623-110-02	4φ (small)
7-623-110-12	4φ
7-623-113-12	6φ
7-623-207-21	2.6φ
7-623-208-21	3φ
7-623-408-05	3φ star (external)
	8φ wave
LUGS	
7-623-507-01	2.6φ
7-623-508-01	3φ
RETAINING RINGS	
7-624-104-01	E-2
7-624-106-01	E-3
7-624-108-01	E-4
7-624-109-01	E-5
7-624-111-01	E-7
7-624-112-01	E-8

Hardware Nomenclature


P – Pan Head Screw
PS – Pan Head Screw with Spring Washer
K – Flat Countersunk Head Screw
B – Binding Head Screw
RK – Oval Countersunk Head Screw
T – Truss Head Screw
R – Round Head Screw
F – Flat Fillister Head Screw
SC – Set Screw
E – Retaining Ring (E Washer)
W – Washer
SW – Spring Washer
LW – Lock Washer
N – Nut
– Example –
Type of Slot
⊕ P 3x10
Length in mm (L)
Diameter in mm (D)
Type of Head
L
D

15. HARDWARES

Part No.	Description
SCREWS	
7-621-259-25	⊕ P 2.6 x 4
7-621-259-35	⊕ P 2.6 x 5
7-621-259-65	⊕ P 2.6 x 10
7-621-560-52	⊕ K 2.6 x 22
7-621-770-64	⊕ B 2.6 x 8
7-621-771-33	⊕ B 2.6 x 5
7-628-254-05	⊕ PS 2.6 x 5
7-628-254-15	⊕ PS 2.6 x 6
7-628-254-35	⊕ PS 2.6 x 10
7-628-254-45	⊕ PS 2.6 x 12
7-682-145-01	⊕ P 3 x 4
7-682-147-01	⊕ P 3 x 6
7-682-148-01	⊕ P 3 x 8
7-682-149-01	⊕ P 3 x 10
7-682-160-01	⊕ P 4 x 6
7-682-161-01	⊕ P 4 x 8
7-682-466-13	⊕ T 4 x 20
7-682-548-13	⊕ B 3 x 8
7-682-550-14	⊕ B 3 x 12
7-682-562-13	⊕ B 4 x 10
7-682-624-01	⊕ PS 2 x 4
7-682-627-01	⊕ PS 2 x 8
7-682-646-01	⊕ PS 3 x 5
7-682-647-01	⊕ PS 3 x 6
7-682-648-01	⊕ PS 3 x 8
7-682-652-01	⊕ PS 3 x 16
7-682-661-01	⊕ PS 4 x 8
7-683-140-01	⊕ SC 3 x 6
7-685-145-31	TA ⊕ P 3 x 6
7-685-146-01	TA ⊕ P 3 x 8

Part No.	Description
NUT	
7-622-108-02	3φ
WASHERS	
7-623-105-12	2φ
7-623-107-02	2.6φ (small)
7-623-107-22	2.6φ
7-623-108-02	3φ (small)
7-623-108-12	3φ (Ni)
7-623-108-18	3φ (Cr)
7-623-110-02	4φ (small)
7-623-110-12	4φ
7-623-113-12	6φ
7-623-207-21	2.6φ
7-623-208-21	3φ
7-623-408-05	3φ star (external)
	8φ wave
LUGS	
7-623-507-01	2.6φ
7-623-508-01	3φ
RETAINING RINGS	
7-624-104-01	E-2
7-624-106-01	E-3
7-624-108-01	E-4
7-624-109-01	E-5
7-624-111-01	E-7
7-624-112-01	E-8

— Hardware Nomenclature —

P – Pan Head Screw .....
PS – Pan Head Screw with Spring Washer .....
K – Flat Countersunk Head Screw ...
B – Binding Head Screw .....
RK – Oval Countersunk Head Screw ..
T – Truss Head Screw .....
R – Round Head Screw .....
F – Flat Fillister Head Screw .....

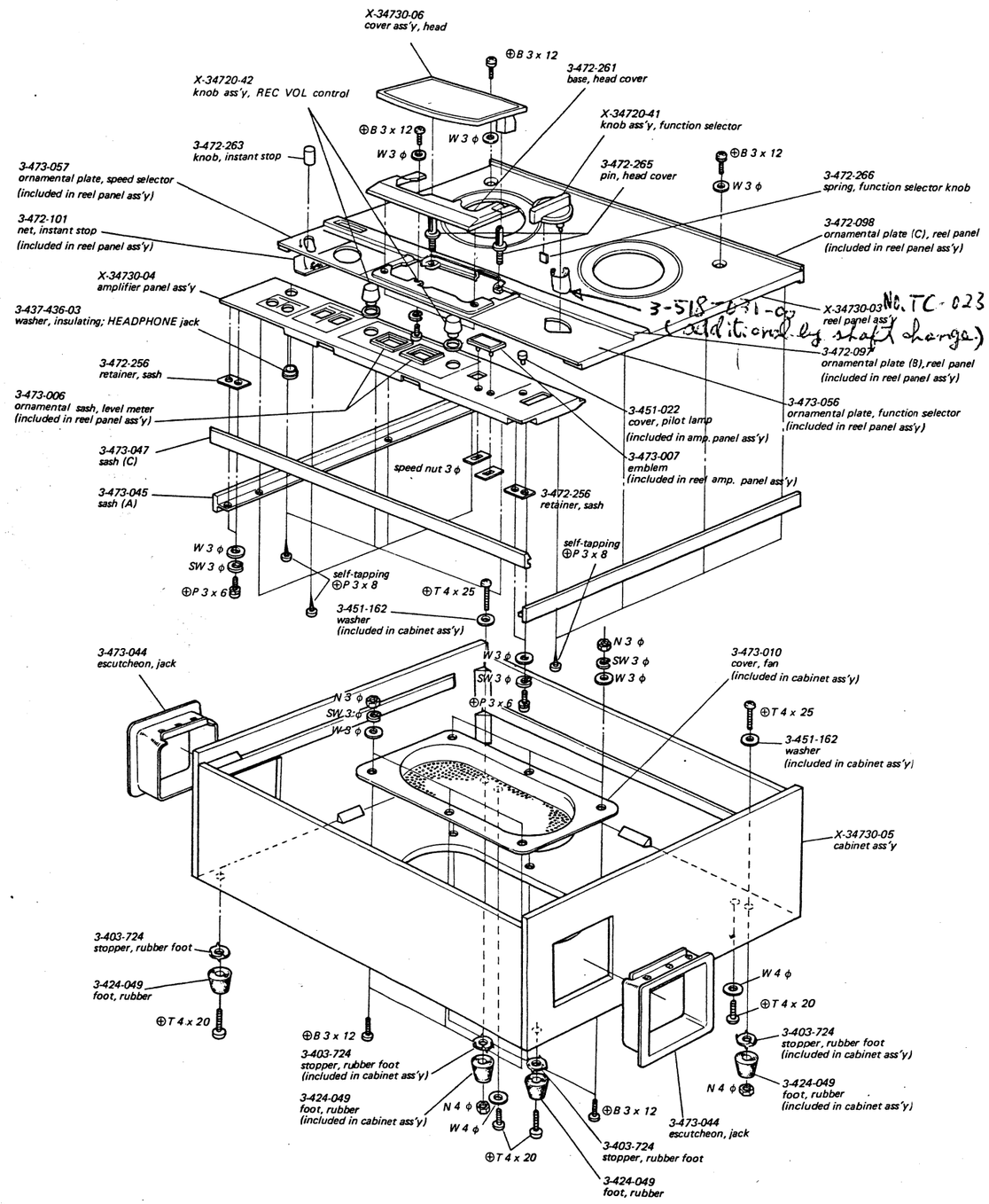
SC – Set Screw .....
E – Retaining Ring (E Washer) .....
W – Washer
SW – Spring Washer
LW – Lock Washer
N – Nut

– Example –

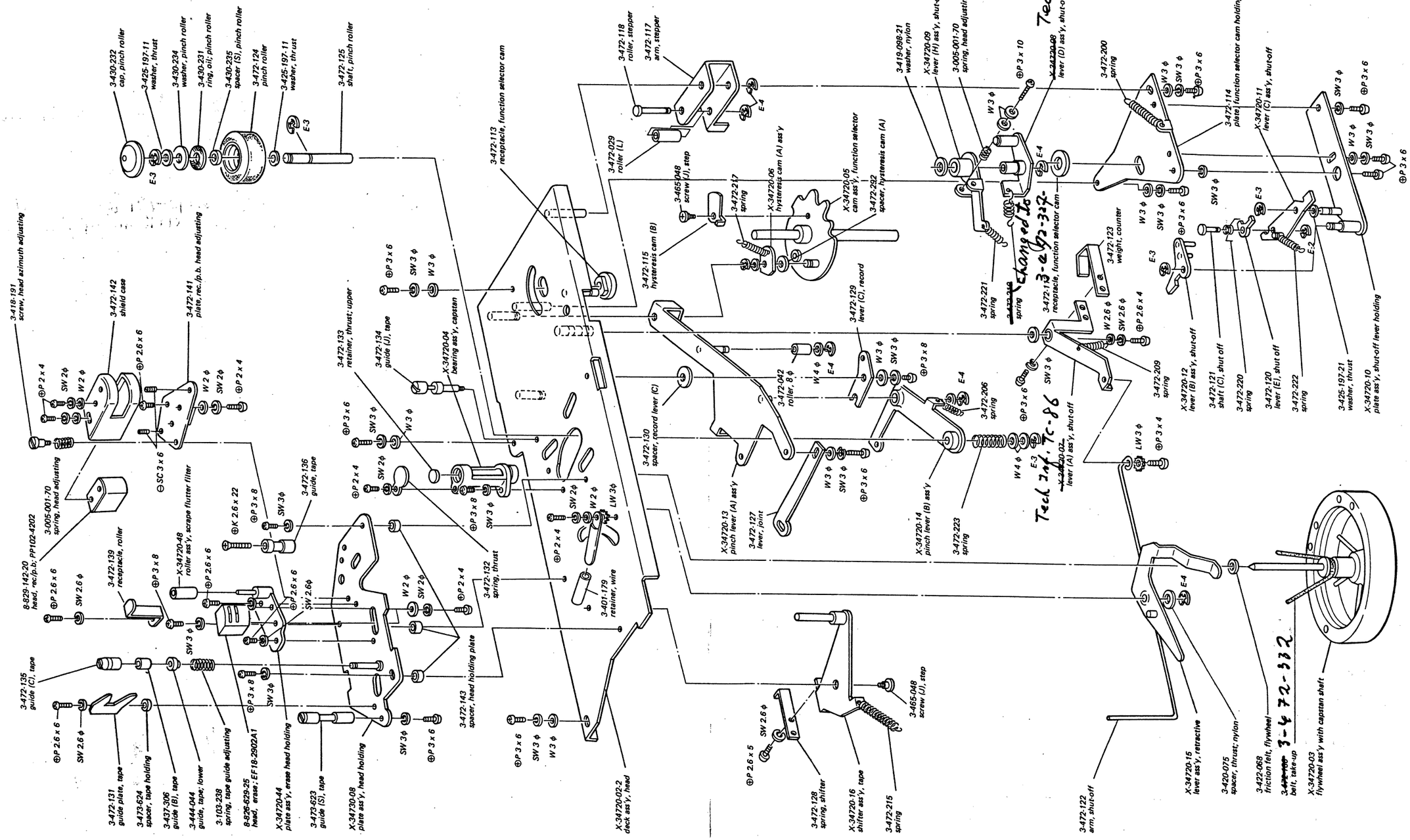
⊕ P 3x10
- Type of Slot
- Length in mm (L)
- Diameter in mm (D)
- Type of Head

16. EXPLODED VIEW

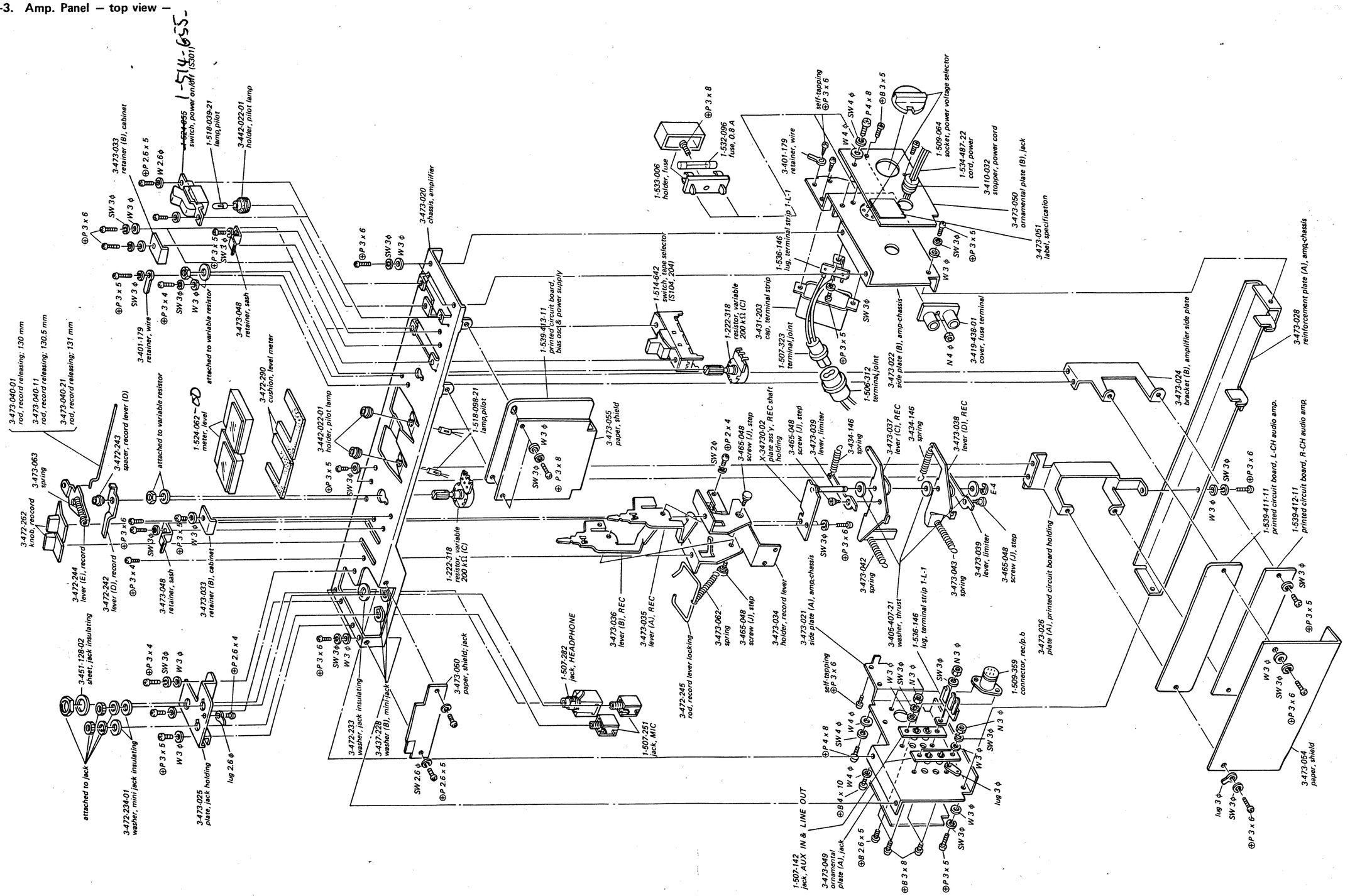
16-1. Cabinet – top view –



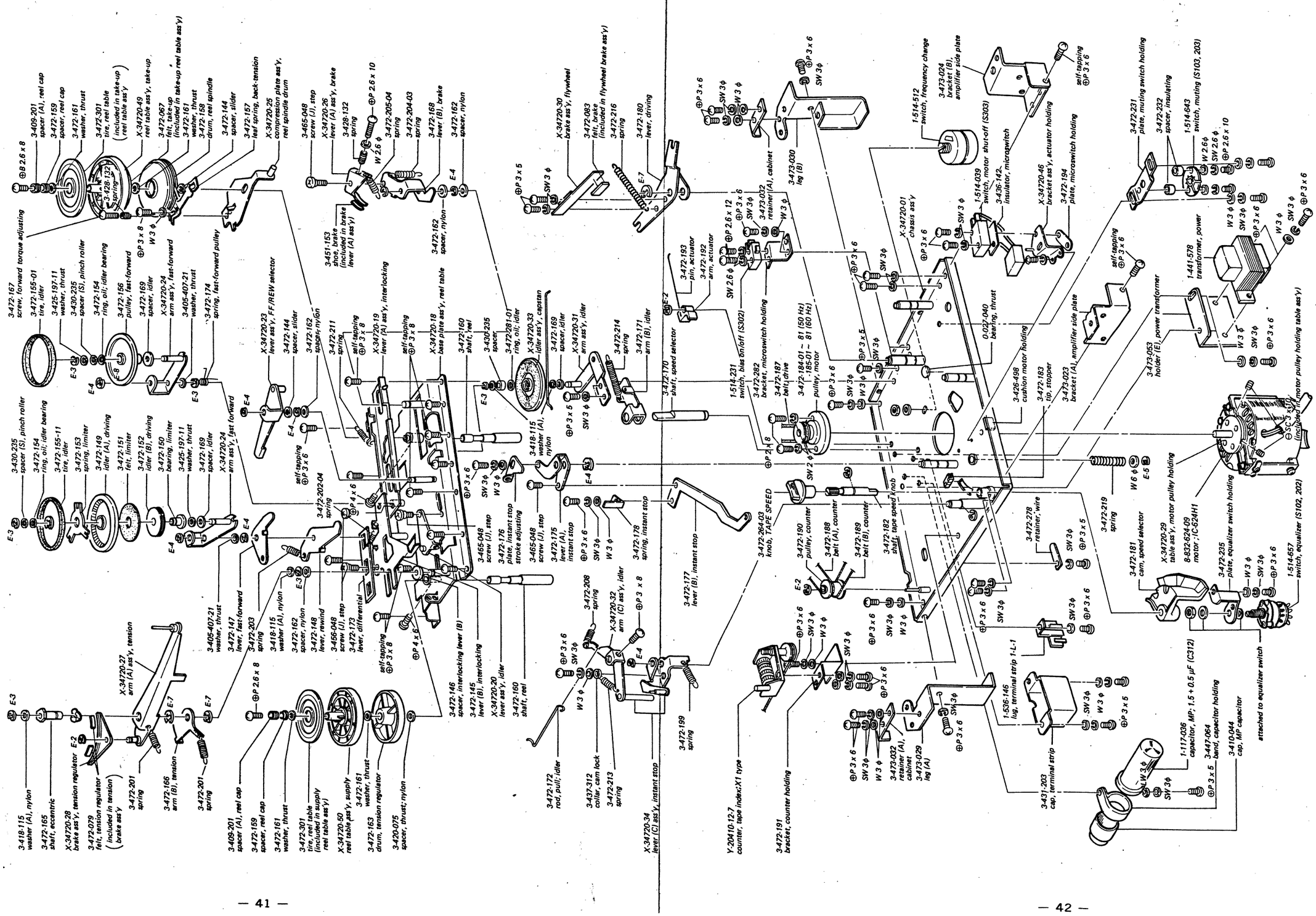
16-2. Head Deck — top view —

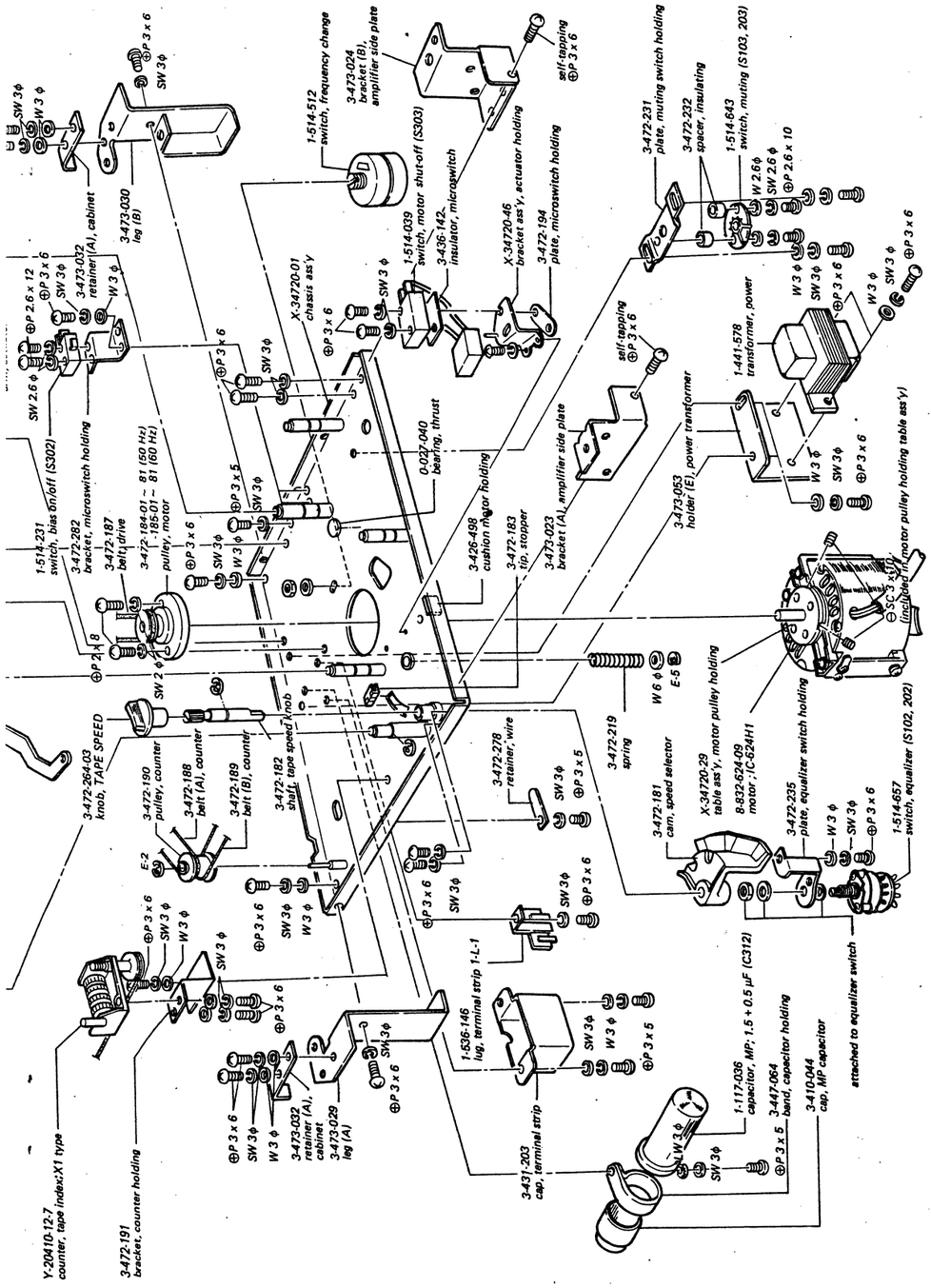


16-3. Amp. Panel — top view —

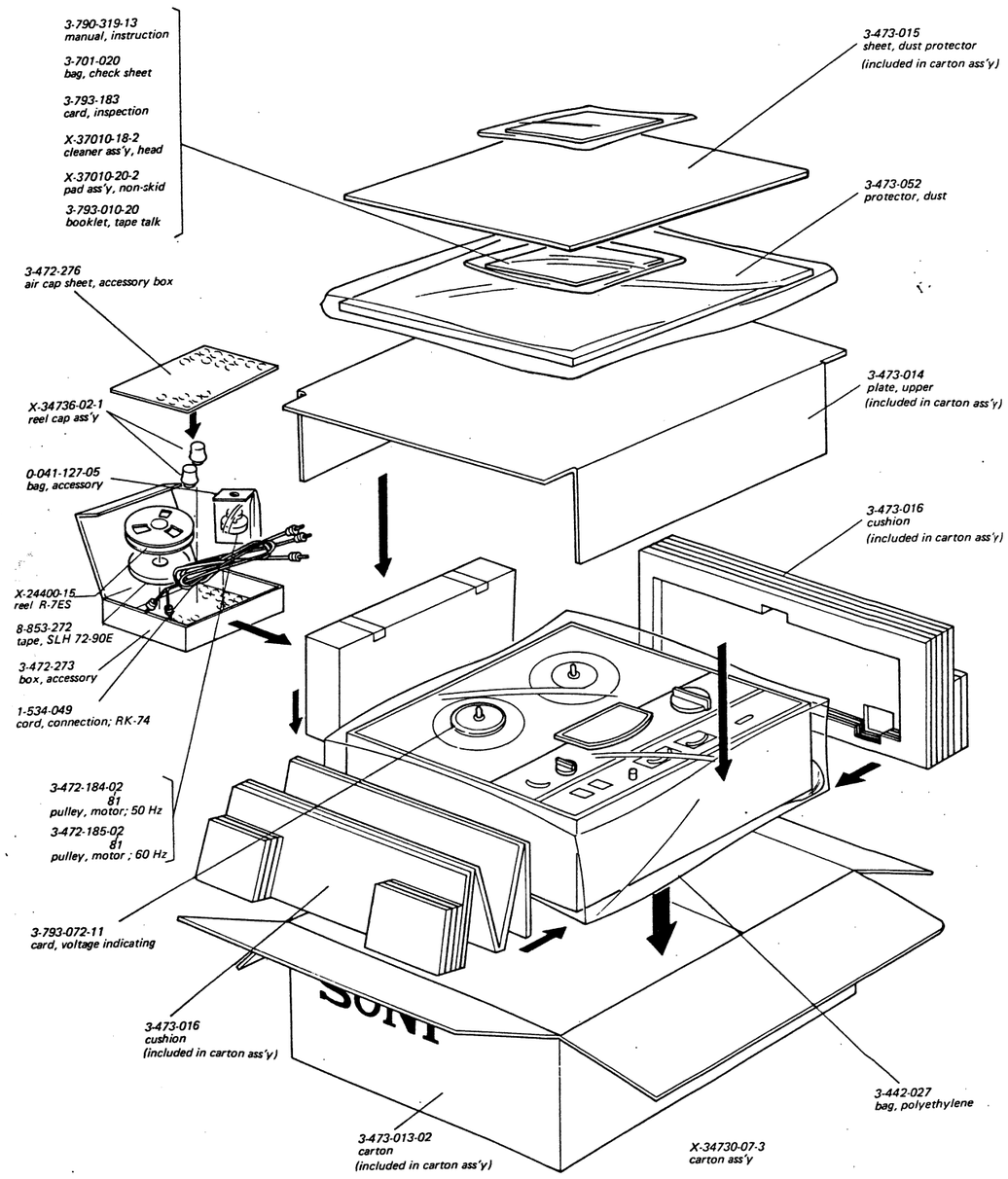

1-514-655
switch, power on/off (S301)
3-473-040-01 rod, record releasing; 130 mm
3-473-040-11 rod, record releasing; 130.5 mm
3-473-040-21 rod, record releasing; 131 mm
3-473-033 retainer (B), cabinet
1-518-039-21 lamp, pilot
3-442-022-01 holder, pilot lamp
3-473-020 chassis, amplifier
1-533-006 holder, fuse
1-532-096 fuse, 0.8 A
3-401-179 retainer, wire
1-509-064 socket, power voltage selector
1-534-487-22 cord, power
3-410-032 stopper, power cord
3-473-050 ornamental plate (B), jack
3-473-051 label, specification
1-536-146 lug, terminal strip 1-L-1
1-514-642 switch, tape selector (S104, 204)
1-539-413-11 printed circuit board, bias osc & power supply
1-222-318 resistor, variable 200 kΩ (C)
3-431-203 cap, terminal strip
1-507-323 terminal, joint
1-506-312 terminal, joint
3-473-022 side plate (B), amp-chassis
3-419-438-01 cover, fuse terminal
3-473-028 reinforcement plate (A), amp-chassis
3-473-024 bracket (B), amplifier side plate
1-524-062-00 meter, level
attached to variable resistor
3-472-290 cushion, level meter
3-442-022-01 holder, pilot lamp
1-518-098-21 lamp, pilot
3-473-055 paper, shield
3-465-048 screw (J), step
X-34730-02 plate ass'y, REC shaft holding
3-473-039 lever, limiter
3-434-146 spring
3-473-037 lever (C), REC
3-473-038 lever (D), REC
3-472-262 knob, record
3-473-063 spring
3-472-243 spacer, record lever (D)
3-472-244 lever (E), record
3-472-242 lever (D), record
3-473-048 retainer, sash
3-473-032 retainer (B), cabinet
3-473-042 spring
3-473-043-01 spring
3-405-407-21 washer, thrust
3-473-021 side plate (A), amp-chassis
3-473-062 spring
3-465-048 screw (J), step
3-473-034 holder, record lever
3-473-036 lever (B), REC
3-473-035 lever (A), REC
3-472-245 rod, record lever locking
3-473-026 plate (A), printed circuit board holding
3-451-128-02 sheet, jack insulating
3-472-234-01 washer, mini jack insulating
3-473-025 plate, jack holding
3-472-233 washer, jack insulating
3-437-228 washer (B), mini jack
3-473-060 paper, shield; jack
1-507-282 jack, HEADPHONE
1-507-251 jack, MIC
1-507-142 jack, AUX IN & LINE OUT
3-473-049 ornamental plate (A), jack
1-509-359 connector, rec/p.b
3-473-054 paper, shield
1-539-411-11 printed circuit board, L-CH audio amp.
1-539-412-11 printed circuit board, R-CH audio amp.

16-4. Chassis – top view –


3-409-201 spacer (A), reel cap
3-472-159 spacer, reel cap
3-472-161 washer, thrust
3-472-301 tire, reel table (included in take-up reel table ass'y)
3-428-132 spring
X-34720-49 reel table ass'y, take-up
3-472-067 felt, take-up (included in take-up reel table ass'y)
3-472-161 washer, thrust
3-472-158 drum, reel spindle
3-472-144 spacer, slider
3-472-157 leaf spring, back-tension
X-34720-25 compression plate ass'y, reel spindle drum
3-472-167 screw, forward torque adjusting
3-472-155-01 tire, idler
3-425-197-11 washer, thrust
3-430-235 spacer (S), pinch roller
3-472-154 ring, oil; idler bearing
3-472-156 pulley, fast-forward
3-472-169 spacer, idler
X-34720-24 arm ass'y, fast-forward
3-405-407-21 washer, thrust
3-472-174 spring, fast-forward pulley
3-465-048 screw (J), step
X-34720-26 lever (A) ass'y, brake
3-428-132 spring
3-451-153 shoe, brake (included in brake lever (A) ass'y)
3-472-205-04 spring
3-472-204-03 spring
3-472-168 lever (B), brake
3-472-162 spacer, nylon
3-472-163 spacer, nylon
X-34720-30 brake ass'y, flywheel
3-472-083 felt, brake (included in flywheel brake ass'y)
3-472-216 spring
3-472-180 lever, driving
3-473-030 leg (B)
3-473-032 retainer (A), cabinet
3-472-193 pin, actuator
3-472-192 arm, actuator
3-472-170 shaft, speed selector
1-514-231 switch, bias on/off (S302)
3-472-282 bracket, microswitch holding
3-472-187 belt, drive
3-472-184-01 ~ 81 (50 Hz) 185-01 ~ 81 (60 Hz) pulley, motor
X-34720-01 chassis ass'y
1-514-512 switch, frequency change
3-473-024 bracket (B), amplifier side plate
1-514-039 switch, motor shut-off (S303)
3-436-142 insulator, microswitch
X-34720-46 bracket ass'y, actuator holding
3-472-194 plate, microswitch holding
0-027-040 bearing, thrust
3-426-498 cushion motor holding
3-472-183 tip, stopper
3-473-023 bracket (A), amplifier side plate
3-472-231 plate, muting switch holding
3-472-232 spacer, insulating
1-514-643 switch, muting (S103, 203)
3-473-053 holder (E), power transformer
1-441-578 transformer, power
X-34720-23 lever ass'y, FF/REW selector
3-472-144 spacer, slider
3-472-162 spacer, nylon
3-472-211 spring
X-34720-19 lever (A) ass'y, interlocking
X-34720-18 base plate ass'y, reel table
3-472-160 shaft, reel
3-430-235 spacer
3-472-281-01 ring, oil; idler
X-34720-33 idler ass'y, capstan
3-472-169 spacer, idler
X-34720-31 arm ass'y, idler
3-472-214 spring
3-472-171 arm (B), idler
3-418-115 washer (A), nylon
3-472-202-04 spring
3-472-175 lever (A), instant stop
3-472-176 plate, instant stop
3-465-048 screw (J), step
3-472-178 spring, instant stop
3-472-177 lever (B), instant stop
3-472-264-03 knob, TAPE SPEED
3-472-190 pulley, counter
3-472-188 belt (A), counter
3-472-189 belt (B), counter
3-472-182 shaft, tape speed knob
3-472-278 retainer, wire
3-472-219 spring
3-472-181 cam, speed selector
X-34720-29 table ass'y, motor pulley holding
8-832-624-09 motor; IC-624H1
3-472-235 plate, equalizer switch holding
1-514-657 switch, equalizer (S102, 202)
3-472-199 spring
3-472-191 bracket, counter holding
Y-20410-12.7 counter, tape index; X1 type
X-34720-34 lever (C) ass'y, instant stop
3-472-172 rod, pull; idler
3-437-312 collar, cam lock
3-472-213 spring
3-472-208 spring
X-34720-32 arm (C) ass'y, idler
3-472-146 spacer, interlocking lever (B)
3-472-145 lever (B), interlocking
X-34720-20 lever ass'y, idler
3-472-160 shaft, reel
3-472-147 lever, fast-forward
3-472-203 spring
3-472-148 lever, rewind
3-456-048 screw (J), step
3-472-173 lever, differential
X-34720-27 arm (A) ass'y, tension
3-472-166 arm (B), tension
3-472-201 spring
3-472-202 spring
3-472-032 retainer (A), cabinet
3-473-029 leg (A)
1-536-146 lug, terminal strip 1-L-1
3-431-203 cap, terminal strip
1-117-036 capacitor, MP; 1.5 + 0.5 µF (C312)
3-447-064 band, capacitor holding
3-410-044 cap, MP capacitor
attached to equalizer switch
3-418-115 washer (A), nylon
3-472-165 shaft, eccentric
X-34720-28 brake ass'y, tension regulator
3-472-079 felt, tension regulator (included in tension brake ass'y)
3-472-201 spring
3-409-201 spacer (A), reel cap
3-472-159 spacer, reel cap
3-472-161 washer, thrust
3-472-301 tire, reel table (included in supply reel table ass'y)
X-34720-50 reel table ass'y, supply
3-472-161 washer, thrust
3-472-163 drum, tension regulator
3-420-075 spacer, thrust; nylon


3-472-264-03 knob, TAPE SPEED
3-472-190 pulley, counter
3-472-188 belt (A), counter
3-472-189 belt (B), counter
3-472-182 shaft, tape speed knob
3-472-191 bracket, counter holding
Y-20410-12-7 counter, tape index;X1 type
3-473-030 leg (B)
3-473-032 retainer (A), cabinet
1-514-231 switch, bias on/off (S302)
3-472-282 bracket, microswitch holding
3-472-187 belt, drive
3-472-184-01 ~ 81 (60 Hz)
3-472-185-01 ~ 81 (60 Hz)
pulley, motor
3-473-032 retainer (A), cabinet
3-473-029 leg (A)
1-514-512 switch, frequency change
3-473-024 bracket (B), amplifier side plate
X-34720-01 chassis ass'y
1-514-039 switch, motor shut-off (S303)
3-436-142 insulator, microswitch
X-34720-46 bracket ass'y, actuator holding
3-472-194 plate, microswitch holding
self-tapping ⊕P 3 x 6
0-027-040 bearing, thrust
3-426-498 cushion motor holding
3-472-183 tip, stopper
3-473-023 bracket (A), amplifier side plate
self-tapping ⊕P 3 x 6
3-472-231 plate, muting switch holding
3-472-232 spacer, insulating
1-514-643 switch, muting (S103, 203)
1-441-578 transformer, power
3-473-053 holder (E), power transformer
(included in motor pulley holding table ass'y)
3-472-219 spring
W 6 φ E-5
3-472-278 retainer, wire
3-472-181 cam, speed selector
X-34720-29 table ass'y, motor pulley holding
8-832-624-09 motor, IC-624H1
3-472-235 plate, equalizer switch holding
1-514-657 switch, equalizer (S102, 202)
attached to equalizer switch
1-536-146 lug, terminal strip 1-L-1
3-431-203 cap, terminal strip
1-117-036 capacitor, MP; 1.5 + 0.5 µF (C312)
3-447-064 band, capacitor holding
3-410-044 cap, MP capacitor
E-2
SW 3φ
W 3 φ
SW 2.6 φ
W 2.6 φ
⊕P 3 x 6
⊕P 2.6 x 12
⊕P 2.6 x 8
⊕P 2 x 8
⊕P 3 x 5
⊕SC 3 x 10

16-5. Packing


3-790-319-13 manual, instruction
3-701-020 bag, check sheet
3-793-183 card, inspection
X-37010-18-2 cleaner ass'y, head
X-37010-20-2 pad ass'y, non-skid
3-793-010-20 booklet, tape talk
3-473-015 sheet, dust protector (included in carton ass'y)
3-473-052 protector, dust
3-472-276 air cap sheet, accessory box
3-473-014 plate, upper (included in carton ass'y)
X-34736-02-1 reel cap ass'y
0-041-127-05 bag, accessory
3-473-016 cushion (included in carton ass'y)
X-24400-15 reel R-7ES
8-853-272 tape, SLH 72-90E
3-472-273 box, accessory
1-534-049 cord, connection; RK-74
3-472-184-02 81 pulley, motor; 50 Hz
3-472-185-02 81 pulley, motor ; 60 Hz
3-793-072-11 card, voltage indicating
3-473-016 cushion (included in carton ass'y)
3-442-027 bag, polyethylene
3-473-013-02 carton (included in carton ass'y)
X-34730-07-3 carton ass'y
SONY